# THE PAPER INDUSTRY and PAPER WORLD

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Look for this trade mark on your felts. It is the mark of quality, and your assurance of service and dependability.

**APPLETON WOOLEN MILLS**
**Appleton, Wisconsin**

. . . . . **Appleton Felts**

ADVERTISING PAGES REMOVED

# TRADE WINDS

## EUROPE'S WAR AFFECTS ENTIRE PAPER INDUSTRY

▶▶▶ THE RUSSIAN INVASION OF FINLAND will indefinitely shut off all shipments of Finnish pulp and paper to the United States. If Russia can take possession of Finland, the attitude of the United States Government is such that there will undoubtedly be restrictions on imports of Russian goods or goods from Finland as a Russia-dominated territory. If Finland can hold out against Russia, she will be too busy on a war program to manufacture goods for export. This situation will materially curtail receipts of imported pulp and paper with Scandinavia already experiencing difficulty with its shipments. Scandinavian wrapping paper exports to this country are already down to less than forty per cent of normal and Finland has been supplying nearly half of the imported kraft purchased in the United States. Preference on shipments seems to be given newsprint, as newsprint forms a materially larger part of Scandinavian paper exports than do wrapping papers.

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▶▶▶ EXPORTS OF PULPWOOD from Crown lands will be continued in Ontario, it was decided after a conference of timber operators and civic officials. The conference was called after Mayor C. W. Cox of Port Arthur, who was largely responsible for securing export privileges for timber operators in 1935, had told the press that he had recommended drastic curtailment or total abolition of raw pulpwood export. The deputation attending the conference agreed that it was to the best interests of the timber industry and the province as a whole to continue the exports, overriding Mayor Cox's one-man stand.

The mayor had stated that the present policy was no longer advisable. An embargo on exports, he said, would force United States companies to locate in Ontario, bringing new industries to the province and that it would permit utilization of more wood in Ontario mills. He also charged that the export business was depleting Ontario forest wealth.

The deputation refuted these statements by stating that the maximum pulpwood exports in any given year were 232,000 cords, representing less than seven per cent of the capacity of the United States mills and that it would be folly to assume that, if this percentage is cut off, new industries would locate in Ontario. The deputation further stated that the carrying on of the export business does not in any way conflict or interfere with the production of local pulp or paper mills and it was as rediculous to assume that if the cutting of export wood were stopped a like additional amount would be utilized in Ontario mills.

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▶▶▶ THE GERMAN BLOCKADE of Scandinavian commerce has been greatly relaxed by the release of pulp cargoes destined for the United States. As soon as the war was fairly under way, Germany had the suspicion—whether well-founded or not—that pulp ostensibly consigned to the United States was actually for Great Britain and, being contraband, all pulp ships were held up for investigation. Through the co-operation of the United States Department of State, an arrangement has been concluded to insure to Germany that cargoes for the United States will actually be delivered here. The arrangement involves co-operation through the auspices of the State Department, of the American pulp importers and the German Government. Release of pulp ships will be facilitated through the use of non-re-export affidavits. These affidavits, signed by American consignees, will be accepted by Germany as evidence that the pulp will be retained in this country and not re-exported to enemies of Germany. These affidavits are prepared before a shipment is ever loaded on shipboard, on the basis of cables from the country of origin to the United States, giving the list of consignees and other shipping details. The consignees' affidavits are sent to the Swedish legation in Washington and then to the State Department. The fact that such affidavits are on file is cabled to the American legation in Scandinavia and will be accepted by Germany as evidence to German warship captains that the shipment may be allowed to proceed.

A similar procedure is used to release ships hitherto held for investigation. A large number of ships which had been held have already been released and the arrival of these delayed shipments explains the unusually large record of pulp imports shown by customs statistics. Shipments originally due to arrive in September and October are now being received.

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▶▶▶ CANADA IS COMBING THE ENTIRE FIELD of Germany's former export trade to help Canadian industries expand their business, according to a report from the Dominion Department of Trade and Commerce which has just issued a report on China, where imports from Germany amounted to about $36,000,000. These imports cover a wide range of goods headed by paper and wood pulp.

The report states that the one commodity from Canada which appears to be the most favorably affected by the present situation is paper including newsprint, printing papers, kraft and other items. Germany, by virtue of her export subsidy arrangements, had captured a large share of the paper trade of China but, the report adds, the war in Europe has completely altered that situation and the outlook is now more attractive.

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▶▶▶ SEVERAL SOUTH AMERICAN COUNTRIES, including Peru, Chile, Ecuador and Bolivia, are besieging Canadian paper producers with request for information on the possibilities of these countries utilizing the Dominion as a source of supply. Many companies have taken advantage of these new markets and have increased their production and profits considerably, it is reported, although Canadian producers are being kept busy with local demands. The following is a list of the paper commodities for which

Canadian sources of supply have been requested:

Peru—Crepe and waxed paper, newsprint, sulphite paper, carbon paper, paper novelties.

Chile—Wallpaper, paper lined and waxed paper bags, woodpulp, coated and enamelled paper, crepe and glassine paper, couche paper, bookbinder's cloth and paper, kraft, paper bags, telegraph tapes, and newsprint.

Ecuador—Newsprint, paper of all kinds, wallpaper, sulphite paper, glazed printing paper, sulphite bond paper.

Bolivia—Newsprint, printing papers of all kinds, bond papers, kraft papers, wrapping papers, and wall paper.

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▶▶▶ MEXICO MUST DEVELOP A MEANS of obtaining wood pulp in order to maintain her paper industry, reports the Canadian trade commissioner in Mexico City. With war in Europe and Canada a belligerent, Mexico has found her import trade in wood pulp disrupted, if not entirely cut off.

A short time before the declaration of war, an organization backed financially by the Mexican Government called for bids for all the necessary equipment for a pulp and paper mill, according to the commissioner. The principal bids were received from German firms, but the war has undoubtedly ruled out the possibility of obtaining any machinery of equipment required for this project. Mexico imports around 40,000 tons of wood pulp per year, principally supplied from the Baltic although some has come from British Columbia.

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▶▶▶ REGULATIONS GOVERNING THE IMPORTING of machinery into the United Kingdom have been released and the list of machines restricted includes paper and board making machinery and paper-making wires.

"Regulations respecting the above described machinery," says the communique, "has been made under United Kingdom Import Prohibition Order, 1939, and applies to machinery, plant, appliances or parts, which were despatched to the United Kingdom after October 24, and in order to import this machinery it is necessary that a license be issued by the Import Licensing Department of the British Board of Trade. Exporters should not ship until they have information that the importer has secured a license or else that he has definitely found out that a license will be available.

"In particular the Import Licensing Department will consider the following points in coming to a decision as to whether licenses may be issued for machinery, etc., specified in any application:

a)—The possibility of obtaining from manufacturers in the United Kingdom other machinery, etc. as the full equivalent or as an efficient substitute.

b)—The general desirability of deferring the importation of machinery, etc., which is not required for work of national importance."

The name and address of the import licensing department is Machinery Licensing Department, 25 Southampton Buildings, Chancery Lane, London, W. C. 2.

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▶▶▶ NEWFOUNDLAND AND AUSTRALIA have concluded final arrangements for the reciprocal reduction of customs duties with a view of increasing the quantity of newsprint exported to Australia. Previously, customs regulations gave a preference to newsprint imported from Canada and England but through an oversight, Newfoundland was omitted from these arrangements.

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▶▶▶ BECAUSE ENGLAND WILL BE ABLE to produce sufficient newsprint for her own wartime requirements, Canada may lose a newsprint market of considerable tonnage. Reduction in the size of British newspapers is a leading factor in the considerably decreased domestic demands of the Kingdom.

There will, however, be an increased demand for wrapping papers and board, it is thought, despite the strict economizing by the civilian British population. On the other hand imports of bond, writing and specialty papers are facing drastic curtailment.

The British Ministry of Supply has taken over all stocks of wood pulp at the actual cost of importation and an average price for each class has been calculated. Control has been exercised over the prices of paper and paper-making materials, the latter having also incurred the added burden of import prohibition except under special license.

The objects of these rulings are to control exchange and to keep the United Kingdom factories working at full strength. Canada's loss can be appreciated when it is realized that in the past England's factories had not been able to meet the requirements of home consumption and so had been one of the main outlets of Canadian exportation.

## ODOR ADSORBER PROTECTS RARE MANUSCRIPTS

Employing a newly invented Odor Adsorber which removes all noxious and harmful gases, odors and vapors from the air, the Widener Memorial Library at Harvard University is safeguarding its rare manuscript collections against the yellowing attack by sulphur dioxide entrained in the atmosphere.

While it has long been known that even the minute quantity of sulphur dioxide present in air causes the age-yellowing and contributes to the deterioration of paper and manuscripts, there has never before been a satisfactory method of handling the problem.

Now, however, with the perfection of a commercial gas and odor adsorber, the problem of protecting and prolonging the life of valuable papers, parchments, prints and other items subject to "gas-attack" has been solved.

This new type of equipment, known as the Dorex Odor Adsorber, is the adaptation of the principle of the ordinary gas mask to air purification on a commercial scale. It involves the use of a special type of highly activated cocoanut shell carbon as the adsorption medium. This carbon, one of the most powerful gas adsorptive agents known, will remove from the air and retain all gases, odors and vapors up to twenty percent of its own weight before it becomes saturated. In average ventilation work the service-life expectancy may be a period of several years, depending upon the degree of concentration of air-borne odors and gases.

According to the manufacturers, the Dorex Division of the W. B. Connor Engineering Corporation, New York, this is believed to be the first installation of an odor adsorber for the removal of $SO_2$ in protecting library collections. Wide use of the equipment has been made in all types of air-conditioning and ventilating work and for the elimination of many types of nuisance odors in industry and other fields.

◆

▶▶▶ THE NEW ADDITION to the Westminster Paper Company, Ltd., New Westminster, B. C., is now in operation. Built of reinforced concrete the three-story building houses modern paper-making equipment for the manufacture of the new MD sanitary napkin. The products of this company include wrapping paper, bathroom tissue, wax paper, paper napkins and the new line of sanitary napkins. The new addition represents an investment of about $125,000.

# *"It made the children laugh and play"*

**. . . to see the Lamb from page 38 at school on page 37**

But the Teacher cried unhappily, "Please go back to your fold."

"I wish I could," the Lamb said. "But I'm *show through* . . . from the Mother Goose rhymes on the next page."

"But you can't just stand there in the middle of a lesson."

"I can unless you speak to the paper maker."

"About using Krebs Pigments?"

"Certainly. Any paper maker ought to know that Krebs Pigments can easily take the *show through* out of even thinnest paper," said the Lamb, pirouetting on an ink well.

" 'Opacity' is the word, I believe," prompted the Teacher. "And please stand still before you mess up my desk."

"Speaking of cleanliness," the Lamb went on, "you ought to see the clean whiteness that Krebs Pigments give to paper. Brightness, too. With sharp, clear printing on both sides."

"Think of it," said the Teacher. "Will the Krebs people help us get on with our lesson?"

"They're glad to help with technical information," said the Lamb. "You just write."

**KREBS PIGMENT & COLOR CORP.**
**1007 Orange Street...Wilmington, Delaware**

General view of one of the sessions of the 44th Annual Congress of American Industry.

# American Industry

## *Declares its Principles*

▸▸▸ THE AMERICAN CITIZEN wants an opportunity to earn the necessities of life and the comforts and luxuries that go to make life richer—not only material necessities, but also the opportunity to enjoy cultural and spiritual satisfactions. He wants to feel secure—in his liberties and for his person, in his job and for his old age—in himself and for his family.

### The American System of Free Enterprise

The achievements of American industry command the admiration of the civilized world. These achievements derive from a system of free enterprise founded on the bedrock of a constitutional government designed to protect the individual in his right to life, liberty, and the pursuit of happiness. The essence of this system is the right of citizens to pursue their individual likes and interests, including the right to acquire, own and use property, all within the restraints of good citizenship. Individual effort is encouraged by the incentive of competition and the opportunity for advancement or profit: the consumer is afforded the assurance of improved products and better values. A fundamental requirement for the successful operation of the free enterprise system is that each individual business shall pursue its own course on a plane of enlightened self-interest.

Competence of leadership and direction of human effort in all walks of life are clearly most important factors in the welfare of any country. Our American industrial system makes possible the kind of management that can secure a co-ordinated use of the combined character, intelligence and intimate understanding of the men and women who know most about their own individual jobs; management capable of giving balanced consideration to the many interrelated factors involved in business decisions; management that commands the confidence of employees; that affords the opportunity for individual leadership at every organization level; that leads, rather than drives; that manages from the bottom up, as well as from the top down; that gives human ability, wherever found, its full chance.

Responsibilities may be differently distributed in different enterprises, large and small, but the co-ordination of managerial effort can be effective only where authority goes hand in hand with responsibility. No authority outside of the individual enterprise, be it industrial cartel, labor union, government bureau or economic dictator, can constructively substitute its dictates for those of the responsible management. Any such outside authority would lack both the specific responsibility and the technical knowledge necessary to a balanced consideration of all the elements involved in problems of sales, finance, production, engineering, research, and employee relations.

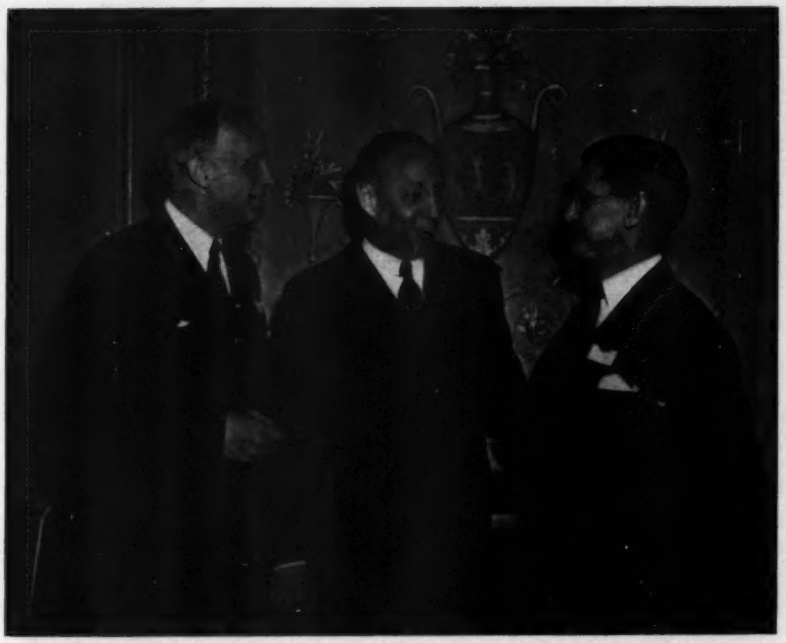
The contribution that American industry can make to the national welfare depends upon the preservation of free enterprise and individual initiative. Laws to protect society from abuses are necessary and desirable, but in the public interest it is essential that any law, or any other process affecting

**Abridgment of original declaration officially adopted at the annual session of the Congress of American Industry, sponsored by the National Association of Manufacturers, held at the Waldorf-Astoria Hotel, New York, on December 6, 7 and 8, 1939. The platform revealed in the declaration is the result of many months of concentrated effort on the part of a drafting committee of nine business leaders representing widely divergent aspects of American industrial life: namely, Clarence Francis, president, General Foods Corporation, (chairman); Chester I. Barnard, president, New Jersey Bell Telephone Company; W. L. Batt, president, SKF Industries, Inc.; Walter D. Fuller, president, Curtis Publishing Company; W. T. Holliday, president, Standard Oil Company of Ohio; Thomas Roy Jones, president, American Type Founders, Inc.; E. V. O'Daniel, vice president American Cyanamid Company; H. Smith Richardson, chairman, executive committee, Vicks Chemical Company; F. E. Schluter, president, Thermoid Company; and S. Clay Williams, chairman, board of directors, R. J. Reynolds Tobacco Company.**

**So fundamental is the entire platform to the well-being of American industry, it is believed this abridgement will prove of interest and of value to every reader of THE PAPER INDUSTRY and PAPER WORLD.**

industry, shall be so framed as not to limit authority of management which would render it unable to fulfill its responsibilities.

Enlightened public opinion is to be sought as the most important force in assuring a constructive course of behavior throughout the whole of society. It is here that the managers of industry, each in his own sphere of knowledge and experience, have a duty beyond the confines of their immediate business. That duty is to bring to the public a better understanding of industry's problems; to demonstrate fallacies present in any existing laws or policies which interfere with constructive development; and to render any possible help in the framing of constructive legislation. In seeking an informed public opinion, it should be recognized that the American industrial system has its roots in the community, and that it is there the relations between industry and the public begin. It is there that popular judgments are crystallized which find expression in law through duly elected representatives.



**Group holds informal discussion at Congress of American Industry. Left to right: Howard Coonley, president of National Association of Manufacturers and chairman of the Walworth Company; H. W. Prentis, Jr., president of Armstrong Cork Company and national vice president of National Association of Manufacturers, and Charles R. Hook, president of American Rolling Mill Company and chairman of the board of National Association of Manufacturers.**

## The Part of Government

Industry's contribution to the national security and welfare, in common with that of the other elements of private enterprise, must be made within a system of laws enacted under the authority of the people and administered by government. Government, in the broad interests of society, must be one of law, and not of men. It must be guided by established principles—not arbitrary action. The people, acting through their elected representatives and within the framework of constitutional government, rightly provide the laws governing the conduct of private enterprise. Regulations thus provided should be designed to stimulate, and not to stifle, the efforts which are made by all elements of the national economy, including industry, to pursue their legitimate ends. If regulation goes beyond the prevention of abuses and the protection of the rights of individual citizens, and moves into the field of affirmative control and direction, it becomes a serious obstacle to the effective functioning of enterprise.

In the efforts made to overcome the depression, political policies and measures have been adopted, often embodying measures of intended reform, which, however good the intention, have defeated the objectives they were expected to meet. Obviously, if industry is to do its full part in promotion of the national welfare, some existing laws should be altered or repealed, and especially labor legislation should be so modified as to insure fairness to the employer, the employee, and the public. A determined effort should be made to so reduce the expenses of government that income would not be exceeded and this desirable achievement effected at the earliest possible time. Taxation should be made on a more equitable and less burdensome basis and government spending programs should be steadily reduced within the limits of practicability.

## The Challenge to Industrial Management

Our national security rests fundamentally upon internal unity and strength. It depends upon an understanding and maintenance of the principles of free enterprise. It depends upon an improving scale of living obtained by maximum employment and the production of an abundance of goods and services at low prices. The requirements for such progress embrace policies and conditions affecting production in all of its branches, as well as distribution, transportation public utilities, banking and finance, foreign trade, and all governmental and social relationships that bear upon our economic life. They relate not only to the whole field of private enterprise, but also to the effect of governmental policy and activity on such enterprise, and to public undertakings as well.

The managers of industry must continue unabated their efforts in behalf of increased production and employment, with ever-increasing realization of the contribution this effort can make to national unity and security. This requires an application by industrial management of policies basic to the welfare of industry as a whole, and to the broader welfare of the nation. Good management will recognize that it serves its own interests best as it strives to serve also the interests of the nation as a whole. Along such a way, with the help of all elements of our society, lies the path of continued opportunity and security, and the greatest promise of national unity and strength.

## Responsibilities Under the American System

For more than ten years, economic progress in the United States has been retarded. This is the longest period in our history in which no new high point of industrial activity and employment has been attained. The low level of production and employment during this decade has emphasized the fact that the welfare of the average citizen is vitally affected by the welfare of industry.

Throughout the years of depression, the most compelling problem before the nation has been the problem of unemployment—unemployment of men, of machines and of money. The problem of unemployment remains un-

solved today, and the obligation to accomplish the solution rests not merely upon those engaged in industry but upon those in every segment of our economic system.

In the problem of idle man power, specifically, it is too generally overlooked that unemployment is not confined to those who are actually without jobs. Inability on the part of those gainfully employed to obtain adequate hours of productive effort also constitutes unemployment of the nation's productive capacity. Until that capacity is used, the problem of unemployment in this broader sense will remain unsolved.

Less than 25 per cent of those gainfully employed in the nation are normally employed in manufacturing. It is obvious, therefore, that manufacturing can absorb only a part of those unemployed. As industrial activity expands, however, the cumulative effects lead to gainful employment throughout the entire economy.

In America today, we are far from having satisfied the wants of our people. These wants can be satisfied only by the production and distribution of more goods for more people. The problem is that of expanding production of goods and services needed and desired with the widest possible distribution of real purchasing power created through productive effort. The solution requires the attainment of a degree of balance in the general price structure, with the necessary flexibility, which will permit and encourage a continuing maximum interchange of goods and services among the various groups in our economic system—a balance among prices generally, between the prices of agricultural products and the products of industry, between raw materials and finished goods. This can be constructively accomplished only by normal economic processes, unhampered by artificial restraints.

The objective before us all is the maximum employment of the nation's man power in industry, trade, commerce, and agriculture, to the end of gaining national strength and security and the resultant individual satisfactions. Requisites to this end, with which industry must be concerned, are as follows:

1) Maintenance of individual initiative and free enterprise, in competition for the consumer's dollar, on the basis both of price and quality;

2) Recognition of the social value of the profit motive as a powerful incentive to all productive effort, and of the economic need for profits in industry sufficient to maintain and expand existing enterprise;

3) Recognition of the vital importance of private savings and investment for providing plant equipment and other resources required for new enterprise and additional employment, and for the production of a larger volume and variety of goods and services for more people.

4) Reduction of the controllable costs of production and distribution of both durable and consumption goods, to the end that prices may be reduced and demand for all goods and services stimulated, and their use and enjoyment by the ultimate consumer increased;

5) Extension of research—market research, engineering research, and research in the fields of science—to the end of developing new and better products at lower prices, with the prospect of increasing production, consumption, and employment;

6) Maintenance by each employer of an equitable and fairly applied policy of employer-employee relations.

7) Maintenance of such equitable wage rates as will promote increased production and employment and a higher income to workers.

Application of this principle requires intimate knowledge of particular conditions which affect each enterprise, with definite consideration of the following:

a) Reasonable hours of employment, affording greater productive opportunity, with due regard to conditions in the community;

b) The greatest possible regularity of production as a means to continuity of employment;

c) Where regularity of production is impractical, the greatest possible continuity of employment through a reasonable variation of working hours.

8) Enlightenment of the public as to the obstacles which obstruct progress toward the attainment of the objectives set forth above, and as to the measures necessary for the removal of those obstacles—whether in the field of government, labor, management, or elsewhere.

In seeking to meet these requisites to maximum employment of the nation's man power, it is recognized that results must come from intelligent action generally throughout the entire range of our national society, under the stimulus of personal responsibility and incentive. Such intelligent action, within the field of industry, requires understanding and a co-operative spirit on the part of men who invest, men who labor, and men who manage. All must recognize the mutuality of interests involved. All must recognize the fact that each individual enterprise has its own particular conditions to take into account. No general rule can be laid down here beyond a statement of fundamental principles common to all of industry. One basic requisite is that each individual enterprise, and each element involved in the progress of that enterprise, must act on the basis of enlightened self-interest.

## The Consumer, the Employee and the Investor

Industrial management should make clear to the consumer, the employee and the investor how the complex requirements of production bear most closely on their respective interests.

**The Consumer—**Industrial management must recognize that upon the welfare of the consumer, the welfare of all the other elements in the industrial economy depends. Industrial management can, to its own interest, benefit the consumer by:

1) Increasing the value of products the consumer needs and wants, reflected both in the price he pays and the quality he receives; to be sought through

2) Long and short-term planning of products and of production, in each individual industrial unit;

3) Use of research facilities available, in the creation of new products, and to the end of increasing the quantity, variety and usefulness, and improving the quality, of the goods put upon the market;

4) Intelligent use of business profits and of individual savings, for modernizing plant and equipment, and increasing facilities for new enterprise and production expansion as needed;

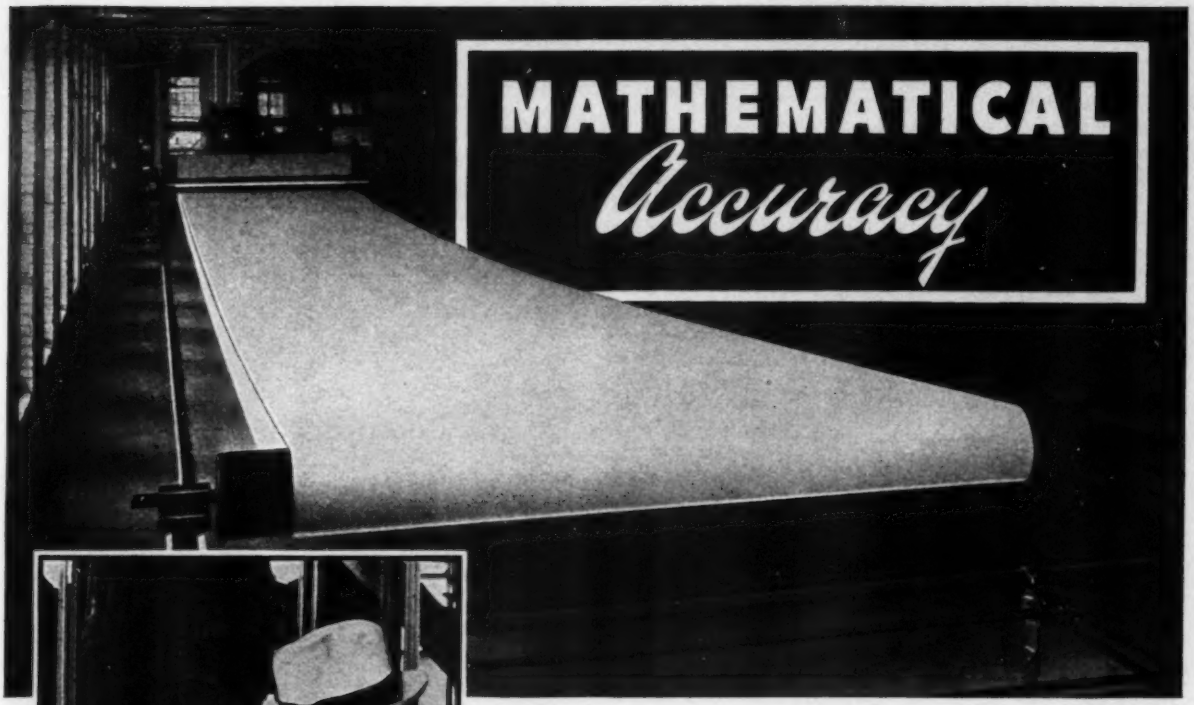
5) Elimination, as far as possible, of economic wastes in the various productive and distributive processes, having in mind the resultant social benefits.

**The Employee—**Industrial management must continue to advance the legitimate and mutual interests of industry and labor, consistent with the interest of the national economy. Specifically, every industrial enterprise must continuously seek to provide:

1) Maximum income, based both on the greatest possible regularity of employment, and on such equitable wage rates, consistent with conditions in the community, as will promote increased production and employment.

2) Employment, retention, and promotion according to ability, with due regard to past service; to the end that individual initiative may be encouraged and rewarded;

3) Co-operation with the employee in making provision against the hazards of death, old age, sickness, and disability;



# MATHEMATICAL *Accuracy*

*Photo, Courtesy The Champion Paper & Fibre Co.*

THE ROLLS, bearings and bushings of a paper machine must be mathematically accurate in order to maintain uniformity of output. Periodical regrinding of rolls and readjustment of bearings is necessary to correct uneven wear and faulty alignment.

The wear and tear on a woolen felt is much greater than that of the metal parts. It cannot be corrected by mechanical treatment. The felt must be uniform in thickness, weave and texture when it goes on the machine. It must wear evenly until it is worn out.

Because Hamilton Felts are woven with special reference to the machines on which they are to operate . . . because they are made of the finest and strongest fleeces . . . because they are mathematically uniform, seamless and pre-shrunk . . . Hamilton Felts require no shut-downs for adjustment. They wear evenly, last longer and cost less.

• *From the thinnest tissue to the heaviest board, there is a Hamilton Felt that will do your work better, faster and at lower cost.* •

## SHULER & BENNINGHOFEN, HAMILTON, OHIO

• Miami Woolen Mills •

# Hamilton *Felts*

• Established 1858 •

4) Safe and healthful working conditions;

5) Understanding treatment by supervisors trained to recognize the employee's abilities, appreciate his problems, and assist him in self-development;

6) A basis for pride and confidence in his job and in his company, and for an understanding of the things his company is doing;

7) Means for free interchange of ideas and negotiation, by any method which is acceptable to employer and employee, and which does not destroy freedom of employment, or jeopardize mutually beneficial relations;

8) Recognition of the right of the employee to join any labor organization, or none at all, as the employee himself may deem best in his own interest, of his own free will and volition, without coercion, duress, or intimidation from any source.

**The Investor—**Industrial management must continue to discharge its stewardship in a manner that gives due consideration to the interests of the national economy as a whole. Specifically, a long range consideration of the investors' interest requires in each individual enterprise:

1) The creation and maintenance of a capital structure which will lend itself to expansion and stand up under the impact of depression;

2) A financial result that will assure of additional capital being available for investment in the enterprise to meet the expanding requirements of the business;

3) Striving for profits that will maintain the stability of the enterprise without exploitation of either the consumer or the employee;

4) A policy on dividend disbursements which, while recognizing the right of the stockholder to an adequate return from earnings on the funds he has invested, will maintain the financial and operating strength of the enterprise;

5) Avoidance of overexpansion of productive facilities in times of boom, with its consequent creation of uneconomic surplus capacity;

6) Effective employment of funds in the development or use of research facilities, to achieve improved processes and products;

7) Reports to stockholders which are clear and informative on the operations and financial conditions of the enterprise.

Industrial management in America is equipped to contribute effectively, in its own sphere, to a constructive solution of the problems the nation faces. The maximum result will be attained with sound governmental policies, and with all elements of the economy—industry, agriculture, labor, distribution, transportation, banking and finance, and the rest—striving to serve the public good. It must be made clear to the public that industry's enlightened self-interest is linked inextricably with the welfare of all of these other elements and with the welfare of the nation as a whole.

▶▶▶ INDUSTRIAL MANAGEMENT must continue to do all in its power to keep alive the faith of the public in the traditional American principles of free enterprise, as the guarantor of individual opportunity and security, by fulfilling its share of the public responsibility resting upon all private enterprise. It must continue to work for a progressively improving standard of living by producing an abundance of needed goods and services at reasonable prices and by seeking to provide more and steady employment. It must continue to utilize, in the public interest, the stimulus which the profit motive provides to the attainment of efficiency and effectivness.

The economic conditions within which business operates, and the operations of business itself, are affected and limited by political action which is controllable, under the American system, only by the public. It is a primary obligation of industrial management, therefore, to make known to all elements of the population, including the consumer, the employee and the investor, the extent of their group or individual stake in the operation of industry. It is the obligation of the management of individual enterprise to make these interests known to those groups of the public with which its operations come in contact, in the communities and areas where they are conducted.

If the American people are convinced by the facts that a sincere and intelligent effort to serve the public interest underlies all effort to serve the legitimate self-interest of each individual industrial enterprise—as in the long run it must—then national strength and security will most surely be advanced, and a balance of opportunity and security for the individual made possible.

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## THE DICTIONARY OF PAPER TERMS AND DEFINITIONS

The need for a suitable dictionary which would be of real value to both the manufacturer and the consumer of paper has long been felt. From time to time efforts have been made to meet this need. In 1924 and 1928 the National Bureau of Standards, with the co-operation of the American Paper and Pulp Association, compiled the book, *Classification and Definitions of Paper* and still more recently Labarre published his *Dictionary of Paper and Paper Terms*.

Unfortunately neither volume actually met the problem. The Bureau of Standards book was a step in the right direction but it did not represent a cross section of the paper industry while Labarre apparently was more interested in the origin and historical proof of the meaning of technical words than in their practical significance.

Three years ago, however, The American Paper and Pulp Association set up a Committee on Classification, Definition and Grading of Paper under its Technical Committee and selected twelve outstanding men, each of whom had a specialized knowledge of some particular field of the industry, to write a dictionary of paper.

Realizing that these men could not give sufficient time to the task, the Association delegated to the Institute of Paper Chemistry the job of correlating, supplementing and editing the material supplied by the Committee.

The *Dictionary of Paper* is now in the process of manufacture and will be ready for delivery about March 1, 1940. It consists of four main parts: The Philosophy of Definition; Classification and Definitions of Pulps; Classification of Waste Materials used by the Paper and Board Industries (which also contains definitions of waste papers used by book mills—assembled for the first time); and Definitions of Papers, Boards and Papermaking Terms. The last chapter contains more than 3,500 definitions most of which have been written by men who are familiar with the products or terms in question.

A large amount of information is contained in the new book which has never before appeared in print. This information was made possible through the co-operation of more than five hundred individuals and mill organizations including technical men, plant managers and others having specialized knowledge.

The definitions in the dictionary have not only been reviewed repeatedly by the Committee but also have been critically scrutinized by the Trade Associations, each Association covering those products which fall within its jurisdiction. Printing terms were edited by experts in this field. In view of the exhaustive and thorough work done on this publication, it is sincerely believed that the new *Dictionary of Paper* will be of great value to all who are engaged in the manufacture, conversion, sale and use of paper.

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Of this you may be certain—that when you call for TITANOX it will be available to you and delivered speedily. Wherever your plant may be located, at least one of our warehousing points is so close by as to insure delivery of sufficient pigment to permit you to carry on until normal shipment can be made.

To assure such cooperation TITANOX has established 26 warehouses at strategic points from which any of the pigments may be had on short notice. And to assure an adequate supply of TITANOX pigments, production capacity of the Sayreville, N. J. and St. Louis, Mo. plants has been increased substantially during the past year, with additional increases now being made.

*Our Service Department always is pleased to assist you in applying TITANOX pigments to your paper products.*

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TRADE MARK

## NEW FILM TELLS STORY OF PAPER

The fascinating story of how paper is made is depicted in a new moving picture entitled "A Short Course in Paper Making" produced by the P. H. Glatfelter Company, paper manufacturers of Spring Grove, Pennsylvania.

The film depicts the complete story of the manufacture of paper from wood cutting operations to shipping the finished product and as such is of great educational value. A sound film completely narrated is now available and after February 1, 1940, a silent film with complete titles will also be available. The moving picture is for the use of business and fraternal organizations, social clubs, schools and individual business firms. A print will be mailed without charge and may be secured by writing the Glatfelter company.

The talkie film is in 16 mm. size only and is 1,200 feet long, requiring approximately 32 minutes for showing. This film must be used on a sound projector as the sound track is on the film. The silent films will be three reels of 400 feet each, requiring the same length of time for showing and will be available also in 16 mm. size only.

The P. H. Glatfelter Company is well qualified to present a complete story of papermaking, being fully equipped with machinery of modern design and operating a pulp mill as well as a paper mill. This concern, now completing its seventy-fifth year under the ownership and operation of the Glatfelter family, is a prominent manufacturer of book, bond, offset, mimeograph, and converter papers.

◆

## HOBERG BUILDING GROUNDWOOD MILL

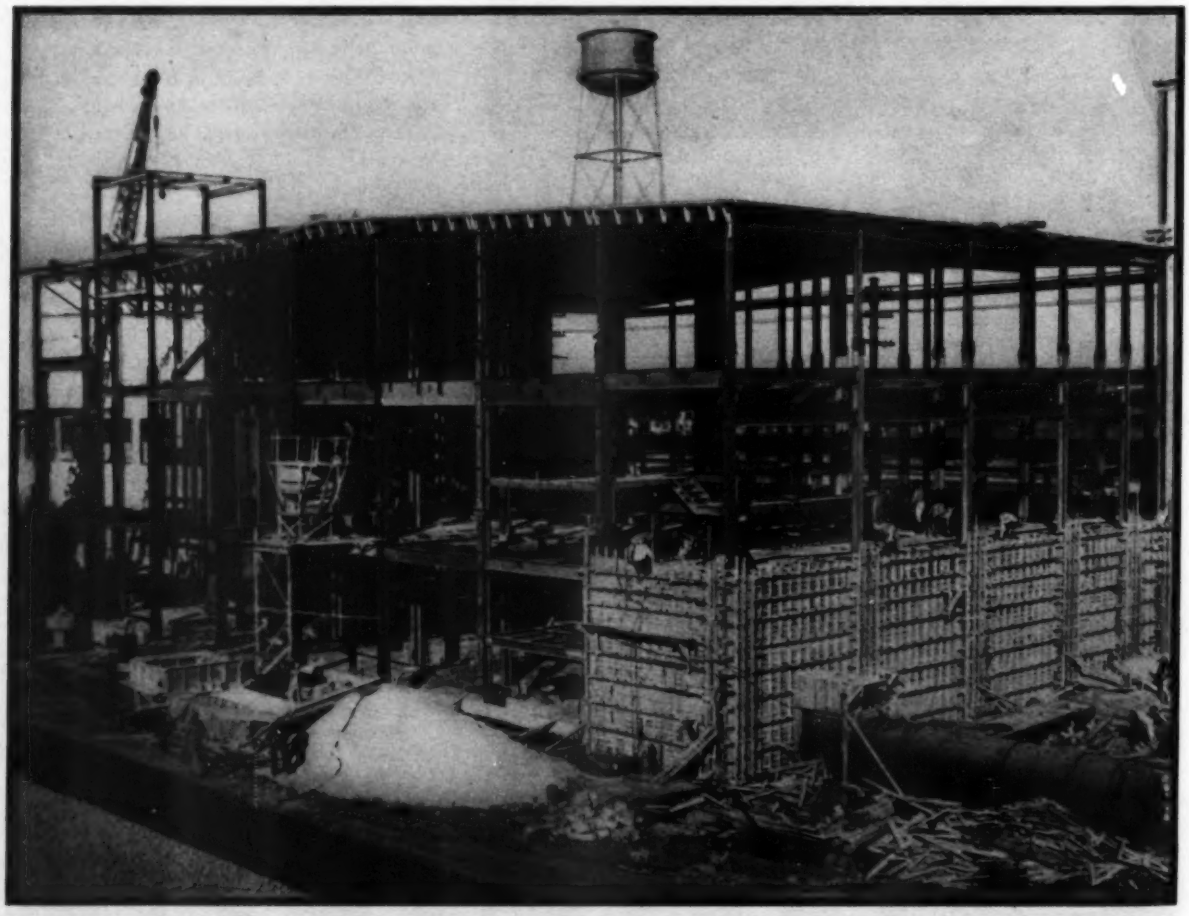
Construction of a $45,000 groundwood mill and stock storage tanks at the Division B plant of Hoberg Paper Mills, Inc., Green Bay, Wisconsin, has been announced by J. M. Conway, president and general manager.

Work has been started and the mill is expected to be in operation by the middle of February, according to E. E. Den. Dooven, general superintendent. Company engineers and millwrights are making the installation. Production is estimated at 20 tons per day.

Chief part of the improvement will be the mill proper consisting of two "four-pocket" grinders with two 27 by 60 inch stones. The grinders will be driven by a 1,350 horsepower motor.

For the Division B plant, the groundwood will be pumped to large stock tanks which are being constructed in the paper mill section. While this system of handling will be used at Division B, part of the groundwood will be lapped on wet machines for transfer to Division A which is several blocks away. All the machinery is being housed in existing space and no additions to buildings were required Mr. Den Dooven said.

"The improvement has been contemplated for some time," Mr. Conway said, "and the Hoberg Mills will now be a self-contained unit in the production of pulp."



**Looking toward the beater room at the new $3,500,000 paper mill now being built at Houston, Texas, by the Champion Paper and Fiber Company. This mill will be devoted to making coated papers.**

# MILES of SMILES

If you would enjoy Miles of Smiles, travel the Timken way! Choose trains that are Timken Bearing Equipped, because roller bearings make possible a new smoothness in riding comfort that is thoroughly delightful. ¶Timken Bearings are on most of America's newest streamliners and locomotives—both diesel and steam. ¶It's only a matter of time before all rolling stock—old and new—passenger, freight cars and locomotives—will be equipped with roller bearings, because Timken Bearings vastly increase comfort—vastly decrease costs—banish hot boxes—maintain schedules. ¶Such cost-cutting, business-getting equipment puts a song in the heart of any railroad operator. That means Miles and Miles of Smiles!

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MILES OF SMILES FOR EVERY MANUFACTURER AND USER OF TIMKEN BEARING EQUIPPED PRODUCTS

## EXPANSION AT KIMBERLY-CLARK

An expansion and modernization program involving an expenditure of approximately $3,500,000 has been announced by Kimberly-Clark Corporation. Properties in Neenah, Kimberly, and Niagara, Wisconsin, will be involved according to S. F. Shattuck, vice president, who made the announcement.

Work on the expansion program at the Badger-Globe mill in Neenah which will eventually result in the employment of 200 more persons involves the transfer of the manufacture of coarse wadding from the Niagara Falls mill where the business was developed. The No. 1 machine at Badger-Globe is being adapted for the manufacture of wadding used for insulation of refrigerators, houses, automobiles, and similar uses. Expansion in this field calls for the construction of a two-story building of steel and concrete to be located on the canal between the old Neenah mill and the present Badger-Globe mill. The building will be 76 by 240 feet and will house a high speed crepe wadding machine on the second floor with room for a second. The new set up is expected to be ready in the spring. Employees quarters will be modernized and a restaurant will be installed in the Badger-Globe arrangement.

Modernization of the Kimberly mill finishing room already is in progress. A 140-inch stack has been transferred from the Niagara Falls mill to Kimberly and a new 1500-f.p.m. roller bearing supercalender stack, 154 inches, was installed. An extension, 53 by 190 feet, to the finishing room is being added as well as roll storage building of a similar size. A new 5,000-kw. turbine and gear driven generator is to be installed in the turbine room and additional equipment has been ordered. The No. 4 paper machine will be rebuilt for the making of an improved type of coated paper.

**Bridge to be built over canal in Neenah, Wis., by Kimberly-Clark Company, to give more direct transportation between the main office and Badger Globe mill to the Lakeview mill.**

New boilers are being installed in a recently constructed boiler house at the Niagara (Wisconsin) mill. Other changes involve the replacing of wooden acid tanks with new stainless steel; the purchase of a new 30 ton Diesel locomotive crane; a new unbleached pulp handling system; and the redesigning and modernization of supercalender stacks.

As another step in the three and one-half million dollar modernization and expansion program of Kimberly-Clark Corporation, a bridge over the canal from the Badger Globe mill to Church Street in Neenah is being constructed. The site of the $20,000 bridge shown in the picture, taken north, will furnish an outlet for Kimberly-Clark traffic other than the North Commercial Street driveway. It will furnish a more direct route for company cars and trucks traveling between the main office and Badger Globe mill to the Lakeview mill located two miles to the west.

The bridge span is to be 100 feet long and 24 feet wide, with 5 foot sidewalks on both sides. A retaining wall 400 feet long will also be built, the start of which is visible in the photograph.

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## EVERETT PULP & PAPER BUILDS BLEACHING UNIT

Construction work was started late in December on a $200,000 pulp bleaching plant at the Everett Pulp and Paper Company's plant at Everett, Washington. According to William J. Pilz, manager of the company, the addition and improvement program, long under consideration, will include a brick and concrete building to house additional pulp screen equipment and a modern multi-stage pulp bleaching plant as well as improvement and enlargement of the company's water filtering system.

The Howard S. Wright Company, represented in Everett by George Schuschart, has been awarded the general contract for the new construction. Machinery contracts have been awarded to the Pulp Bleaching Corporation of Orange, New Jersey.

The addition of modern equipment as embodied in this expansion program now under way will be reflected chiefly in an improved quality of the company's products as well as an increase in the output capacity of the mill, it was stated by the management.

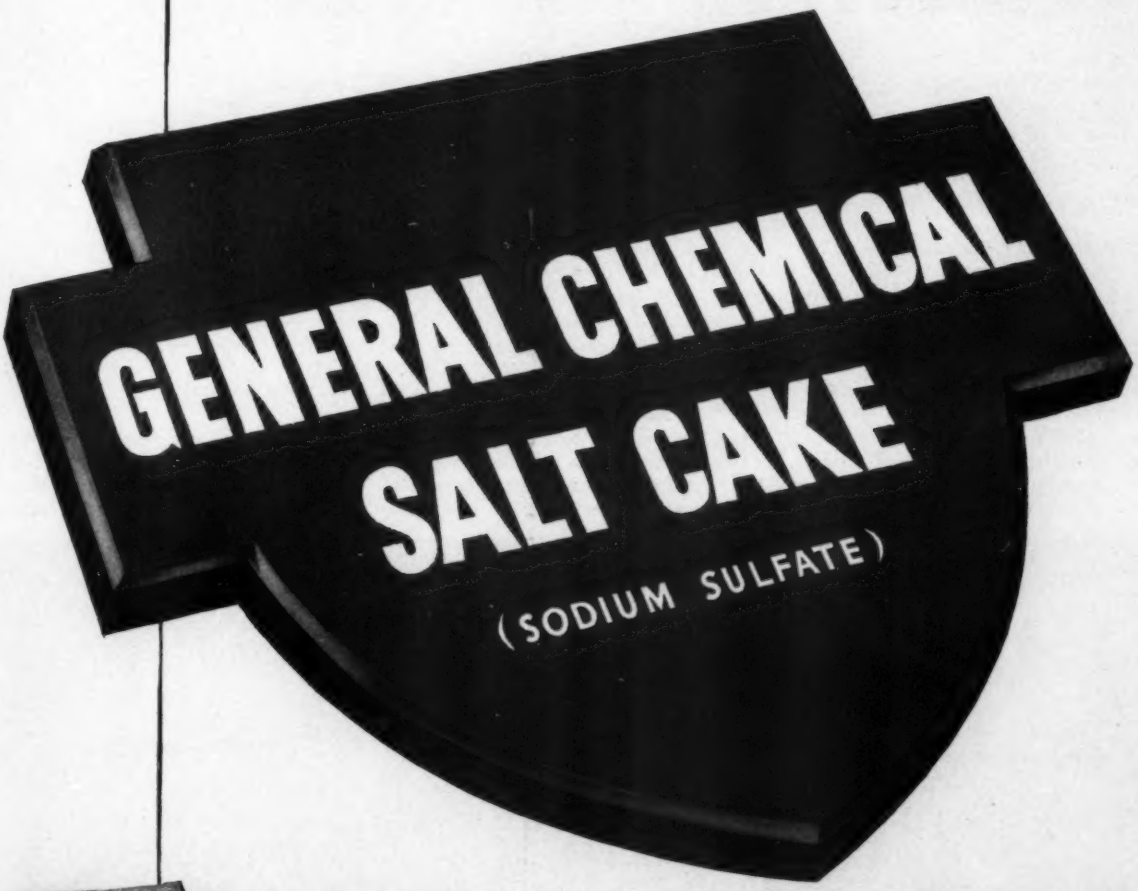
The Everett Pulp and Paper Company manufactures book, writing, mimeograph, and label papers. The company supplies the Pacific coast and also exports considerable quantities.

**The new plant of Kieckhefer Container Company at Manitowoc, Wis., just completed.**

General Chemical Company's long experience in producing Salt Cake has resulted in a knowledge of the manufacturing controls necessary to the production of Salt Cake especially suited to needs of Paper-making. Salt Cake is but one of many products—Aluminum Sulfate (Commercial and *Iron Free*), is another—produced by General Chemical for this industry. Each offers particular advantages to paper manufacturers.

General Chemical Salt Cake users also have the advantage of taking delivery from the nearest of several producing plants.

Your copy of "Products of General Chemical Company" gives further information on General Chemical Salt Cake and other products used in the paper-making industry. If you haven't received a copy, write for it today.



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▶▶▶ ONE OF THE MOST RECENT DEVELOPMENTS in lignin chemistry is a new vegetable-source vanillin produced on a large scale at a low cost. Not only does this add another product to the long list of those made from trees, but it adds another important chapter to the intensive study of the subject of the utilization of paper-mill by-products.

Two years ago the Salvo Chemical Corporation completed a plant which is an adjunct to the plant of the Marathon Paper Mills Company at Rothschild, Wisconsin. Here, through the use of raw lignin material obtained from the Marathon-Howard process, the Salvo plant is now furnishing nearly 50 per cent of the vanillin consumed in this country.

**View of Salvo Chemical Corporation building from the south. At the upper left is shown part of the conveyor which connects the Salvo building with the main process plant of the Marathon Paper Mills Company.**

# Vanillin *from* LIGNIN

It had been known for many years that lignin was a valuable potential source of vanillin, but it was not possible to effect a commercial utilization in the United States until a pure lignin sulphonic acid was produced by the Marathon-Howard process.

Synthetic vanillin previously had been obtained from two main sources: (a) the so-called guaiacol vanillin from benzol derivatives; (b) the so-called vegetable or eugenol vanillin from clove oil or cinnamon leaf oil. The latter sold at a premium of ten cents per pound over the guaiacol product. The new lignin vanillin, although of vegetable origin and possessing high flavor value, is sold at the same price as the benzol product and is an illustration of the changes brought about by a new chemical raw material.

Lignin from spruce and other coniferous woods is used in the new process. About half the weight of the tree is in the form of cellulose fiber. This is made into pulp. Lignin, and the other constituents of the wood, dissolved in the cooking liquors, formerly was thrown away as waste material. By working out an economical utilization of this waste, Guy Howard, of the Marathon Paper Mills Company, made available a new chemical raw material which is being recognized as having an importance comparable with coal tar and cellulose materials, the by-products of which have founded so many large industries.

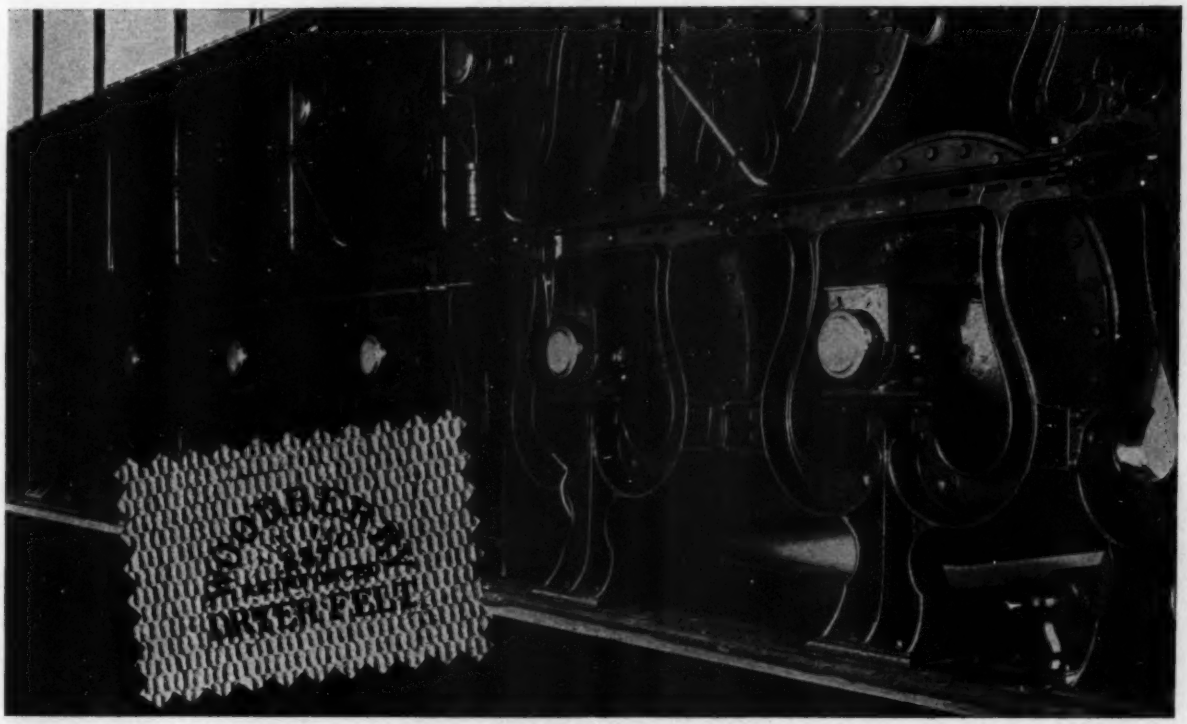
In the Marathon-Howard process, the liquor from the cooking of wood is piped into what is called the main process of the chemical plant. The first step is the addition of calcium hydrate, which brings about the precipitation of an inorganic product which is mainly calcium sulphite. This is returned to the pulp mill for use in the make-up of cooking acid, and the credit thus recovered pays for a considerable part of the chemical process.

The second step is the addition of a further amount of lime reagent, which precipitates the lignin raw material itself, in the form of a basic calcium

**Left—The extractor battery in which vanillin is extracted from the processed lignin. This view shows piping details and control instruments. Center—The purification side where crude vanillin is isolated. Right—Glass-lined crystallizing vessels for vanillin.**

# WOODBERRY Reinforced 887 Dryer Felts . . .

## *March on to Greater Achievements*



*PATENTED ASBESTOS REINFORCING EFFECTS IMPORTANT ECONOMIES*

Lower dryer felt costs, improved qualities of paper, fewer machine stops, fewer adjustments, higher production are all part of the reports from paper mills which have adopted WOODBERRY Reinforced 887 dryer felts. Asbestos yarns woven at intervals into the face of these felts greatly prolong their life and eliminate many production delays. Shrinkage and stretch in WOODBERRY 887 Reinforced Felts have been reduced to a minimum. Steam consumption is low. Specify these modern dryers for maximum efficiency and minimum dryer felt costs.

MT. VERNON WOODBERRY MILLS, INC.

**TURNER HALSEY COMPANY**

*Selling Agents*

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salt of lignin sulphonic acid called OP, for Organic Precipitate. This OP, when settled and filtered by vacuum filters, is in the form of a filter cake readily available for further processing into the various chemical products now being sold by the Marathon Paper Mills Company.

In the case of vanillin, the OP filter cake is mixed with caustic soda and delivered to the plant of the Salvo Chemical Company, which is located adjacent to the main process plant of Marathon in order to secure unlimited raw materials. The OP at present available contains about 1,500,000 lb. of vanillin a year, about four times the annual consumption in the United States. Only a part of this supply is being utilized in the Salvo plant at present.

In the Salvo plant, the OP caustic soda liquor is subjected to a controlled cooking operation in which the caustic soda attacks the lignin molecule, forming vanillin and a desulphonated lignin which constitutes a base of plastic resins. The vanillin is extracted from the liquor with an organic solvent which is selective in that only the vanillin is removed. The solvent is then evaporated and returned to the extraction towers, while the vanillin is put through a purification process and distilled in the form of a chemically pure, colorless oil. The oil is then taken up in water and recrystallized in the form of fine needle crystals, which is at present the preferred selling form, as it flows readily and is easily dissolved.

The final product is exceptionally pure, snow white in color, with a melting point of 81¾ deg. C. It is used throughout the flavoring industry in the manufacture of candy, ice cream, biscuits, etc.

The cost of the production itself, which is carried out in relatively simple apparatus, is extremely low due to the pure form of the starting material, but the whole operation receives a further credit through the utilization of the affluent liquors of the vanillin operation. By an arrangement between the two companies, these liquors are piped to a new plastic plant recently built by Marathon, and constitute the cooking liquor for the manufacture of a lignin enriched plastic pulp, and for the precipitation of molding resins. The new molding materials have attracted wide attention, since in some forms they possess a weight-for-weight strength comparable with steel.

The new plastic plant is in the form of the first group of a unit process. The plant has a present capacity of 25 tons per day, which can be increased to 350 tons per day by the addition of more units.

## BEACON BILL DIDN'T FORGET

▸▸▸ NEEDY FOLK in Port Angeles, Washington, got a pleasant surprise this year. "Beacon Bill" returned to them for Christmas.

"Beacon Bill," like Santa Claus, had been in the habit of never failing to come around on Christmas, but this year, because he had moved to San Francisco, it looked for a while like he might have forgotten.

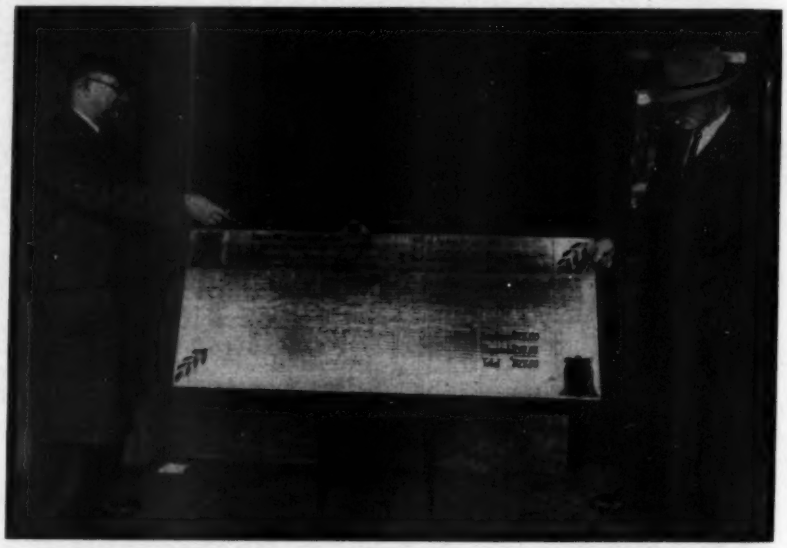
"Beacon Bill," in real life William D. Welsh, had not forgotten. For 17 years, as editor of the *Port Angeles Evening News*, Mr. Welsh had conducted a sort of a one-man community chest drive for funds under the name of "Beacon Bill," to raise money to supply Christmas baskets to needy people and to take care of a multitude of relief odds and ends throughout the year in the town.

Last spring, however, Mr. Welsh took an executive position at the headquarters of Crown Zellerbach Corporation and Rayonier, Inc., in San Francisco. "Beacon Bill" didn't like to ask for a vacation to go away but he put the question up to his employers.

"Port Angeles is a pulp and paper town," they replied, "and we think your relief work there is too valuable to end now."

So the corporations promised Mr. Welsh that so long as he worked for them he would be given leave of absence every December, at their expense, to return to Port Angeles and operate his "Beacon Bill" campaign.

So "Beacon Bill" went back to his old home town early this last December and, with the columns of his former newspaper again open to him, he conducted the most successful campaign for funds in the eighteen years of "Beacon Bill" history. More than $5,000 was raised among the townspeople in the community of about 11,000 population.



**Wm. D. Welsh (left), known to many as "Beacon Bill," and Max Johnson, Rayonier painter, admire the hemlock plank steak inscribed with the names and amounts of Rayonier employee contributors to the "Beacon Bill" relief fund.**

The largest group contribution was that of the Rayonier mill and employees in Port Angeles who turned over $826 to the fund—$626 from the employees and $200 from the mill. For many years the Rayonier workers have made up a big "plank steak" of hemlock cut at their mill, have signed their names and the amounts of their contributions to the plank, and have turned it over to "Beacon Bill" along with their cash. They repeated the custom this year. Generous donations also came from the Washington Pulp and Paper Company mills and the Fibreboard Products mill.

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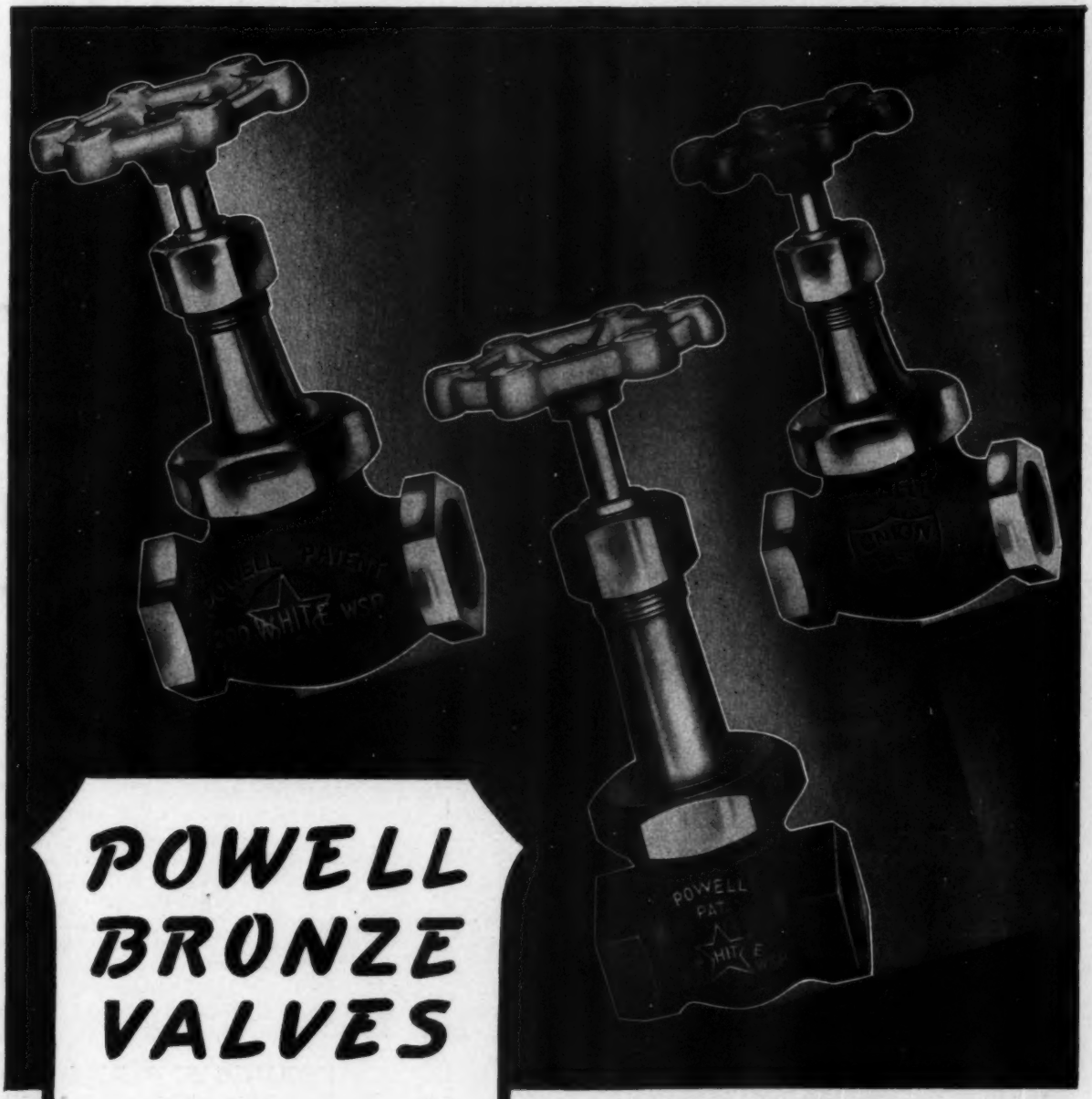
## CHRISTMAS AT K. V. P.

A real, genuine Christmas party—full of Christmas spirit and good will was held at the Kalamazaa Vegetable Parchment Company. There have been Christmas parties before at KVP—in fact the annual KVP Christmas party is almost as old as the company itself—but the 1939 party was termed by most as the "best ever."

Homer Rodeheaver, as the special guest, was complete master of the occasion and his abilities as a song leader soon came to the fore as the party got




# POWELL BRONZE VALVES

*Do a Better Job for a longer time!*

**POWELL BRONZE VALVES** ARE CAST PRINCIPALLY FROM VIRGIN METALS WITH A HIGH TIN CONTENT TO IMPROVE THE PHYSICAL CHARACTERISTICS.

POWELL BRONZE VALVES ARE FUNDAMENTALLY CORRECT IN DESIGN TO WITHSTAND THE MOST EXACTING OPERATING CONDITIONS.

POWELL BRONZE VALVES ARE MADE TO GIVE SATISFACTION—TO DO A BETTER JOB FOR A LONGER TIME!

# POWELL VALVES

THE WM. POWELL CO. CINCINNATI, OHIO

under way. Many people who never really broke into song before, did so with vim and vigor. Mr. Rodeheaver's stories—his personal experiences and the anecdotes he related—together with the music from the KVP band and the Parchment Singers' choral offering added to the general enjoyment of the occasion.

The KVP community house was packed to overflowing with employees and their families each of whom received a gift as they left.

As a permanent record of the event, nearly every word and every musical note of the KVP party were picked up by recording machines and are now being edited so that the important parts of the program will be complete on separate discs. Duplicate discs will probably be made and sold to those who wish to have a permanent record of the party.

Just two days previous to the Christmas party one of the most significant events in KVP history took place when 117 men and women employees became members of the brotherhood of "Old-Timers," at a special celebration tendered them by the management. This was the largest group ever to receive service pins at one time. Of the 115, 33 were 15-year employees and 82 were 10-year employees. The group was addressed by "Uncle Jake" Kindleberger, chairman of the board, and the pins were presented by R. A. Hayward, president. This new addition to the "Old-Timers" swells the group to a total of 518. Special places were reserved for them at the Christmas party.

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## TWO H & W MILLS TO CLOSE DOWN

Announcement has just been made as this issue goes to press that the Hollingsworth and Whitney Company's two mills at Gardiner, Maine, will be closed down permanently.

Both the Cobbossee mill and the Aroostook mill are equipped with 94-inch fourdrinier machines. The Cobbossee mill is also equipped with one double cylinder machine. Both mills manufacture bonds, fine manilas and specialties. The Cobbossee mill also manufactures tag board, map, writings and railroad manilas.

Disposition of the bulk of the equipment of the plant has not been decided upon at present although it is said that some of the equipment may be removed to the new H. & W. mill at Mobile, Alabama. Both the Aroostook and Cobbossee mills at Gardiner have been operated continuously since 1875.

Mrs. Dorothy Lambeau (left), who unveiled memorial bronze bust of William P. Wagner, and Judge Henry Graass, who made dedicatory address at Green Bay, Wis.

## DEDICATE BUST OF W. P. WAGNER

A memorial bronze bust of William Perry Wagner, late president of Northern Paper Mills, Green Bay, Wisconsin, was dedicated at ceremonies held there recently by the Northern Welfare and Safety Club, donors of the memorial.

The bust stands in the lobby of one of the paper mill buildings. Judge Henry Graass, of Green Bay, made the dedicatory address, and the memorial was unveiled by Mrs. Dorothy Lambeau, secretary of the club. Various mill officials addressed a crowd of close to 3,000 employees and their families who attended the affair. Members of the Wagner family were also present. Mr. Wagner was one of the founders of the Northern Mills and was its first president.

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## SOU. KRAFT TO INCREASE ITS CAPACITY IN SO.

Improvements which will make available an additional capacity of 330 tons of container board per day or 110,550 tons per year are now being made to the Southern Kraft Corporation's mills at Georgetown, South Carolina, and Springhill, Louisiana. This additional capacity, to cost over $650,000, will be in operation by April 1.

The Southern Kraft Corporation reached a record production during the last quarter of 1939 by producing approximately 171,000 tons of container board. The bulk of its capacity of this product is located at its Panama City, Georgetown and Springhill mills which have a present average capacity of 1,700 tons per day. Up to September, 1939, demand for the product was only sufficient to permit these mills to run at an average rate of less than 75 per cent of capacity but the heavy demand which began in that month has run these mills at capacity since that time. By April 1, the Southern Kraft Corporation will have a container board manufacturing capacity of over 1,000,000 tons per year as against an actual board production of about 510,000 tons in 1939.

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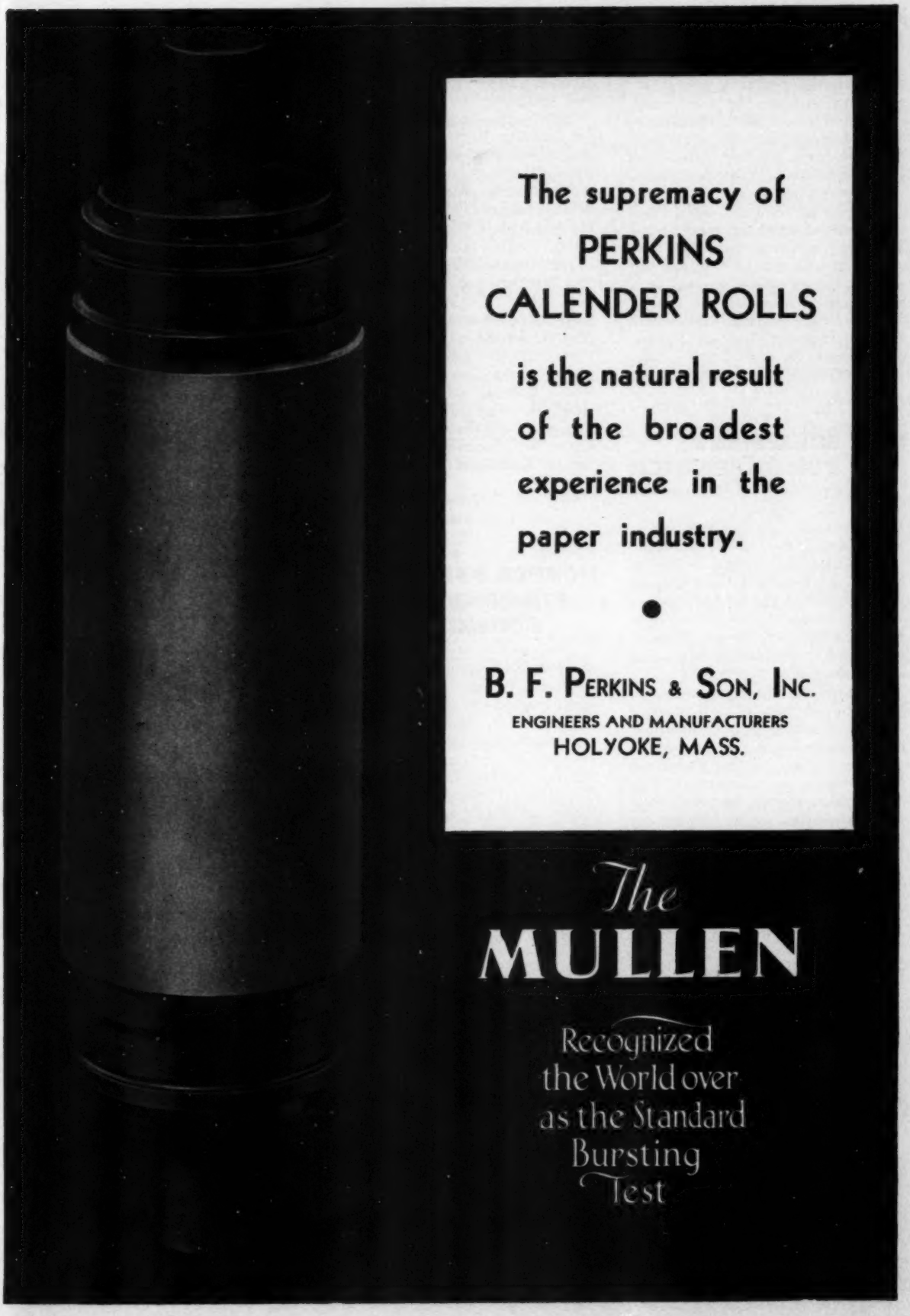
## CHANGE IN PLANS AT LAKE SULPHITE

The reorganization of the Lake Sulphite Pulp Company will be brought about by the construction of a unit for the manufacture of unbleached sulphite instead of the original proposal for a bleached sulphite mill and facilities for rayon pulp development as reported earlier.

The change is explained by the fact that while some $3,500,000 will be required for the unbleached sulphite unit, $6,000,000 would be required for the bleached sulphite or the rayon pulp development. Another important factor is the strong U. S. demand for unbleached sulphite and the rise in price of this commodity which for the first quarter of 1940 has been raised to $50 per ton contract price.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is the natural result
of the broadest
experience in the
paper industry.
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ENGINEERS AND MANUFACTURERS
HOLYOKE, MASS.
The
MULLEN
Recognized
the World over
as the Standard
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Test

## A VERY HELPFUL IDEA FROM K V P

Many paper mill organizations constantly are disseminating helpful, inspirational material. In this group, notable mention is due the Kalamazoo Vegetable Parchment Company, Parchment, Michigan, for its mottoes and gems of philosophy that are always welcomed at this office.

The monthly calendar card is particularly outstanding and far-reaching. The truths carried on the reverse side of this calendar can be displayed and benefit all who read them long after the calendar has passed into history.

Some will recognize the motto "Keep It Burning" (to which reference is made on Page 1042) as having appeared on the January calendar sent out by KVP.

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## NEW EQUIPMENT FOR BRUNSWICK

Additions and improvements involving the expenditure of about $500,000 will be made to the plant of the Brunswick Pulp and Paper Company, Brunswick, Georgia, it was announced recently by Edward Gayner, president of the Southern concern, which is jointly owned by the Scott Paper Company of Chester, Pennsylvania, and the Mead Corporation of Chillicothe, Ohio.

The additions and improvements involve the addition of a digester, a spiral heat exchanger, a 75-ton recovery unit, a back pressure turbine, certain screen room changes, a new and larger washer, an additional barking drum and conveyors, bleaching additions, pre-dryers on the drying machine, a new lime kiln, and an enlarged warehouse and a water-softening system. It is expected that these additions will increase the rate production capacity of the plant from about 150 tons per day to nearly 200 tons.

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## MENASHA PRODS. DIVISION TO HAVE NEW UNIT

Work on the new $175,000 office building and plant addition of the Menasha Products division of the Marathon Paper Company, at Menasha, Wisconsin, is proceeding rapidly. The building, bounded by River Street and the river, is three stories high and is to contain the general offices and carton plant No. 2. Although work was started on the latter first, the attention was shifted to the office addition inasmuch as offices are now temporarily housed in the basement of a local high school.

## COMING EVENTS

Jan. 22-26—Sixth International Heating and Ventilating Exposition, Lakeside Halls, Civic Center, Cleveland, Ohio.

Jan. 24-26—Technical Section of the Canadian Pulp and Paper Association, Annual Meeting, Mount Royal Hotel, Montreal, Canada.

Feb. 19-22—American Paper and Pulp Association, Annual Meeting, Waldorf-Astoria, New York City.

Feb. 19-22—Technical Association of the Pulp and Paper Industry, Annual Meeting, Roosevelt Hotel, New York City.

April 1-6—Coastal Empire Paper Festival, Savannah, Georgia.

May 19-20—National Paper Box Manufacturers Association, Twenty-Second Annual Convention, Coronado Hotel, St. Louis, Missouri.

June 18-20—American Pulp and Paper Mill Superintendents Association, at Netherland Plaza Hotel, Cincinnati.

Oct. 7-11—National Safety Congress and Exposition, Stevens Hotel, Chicago.

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## HOPPER PAPER AIR-CONDITIONS FINISHING ROOM

A thoroughly air-conditioned finishing room with controls which make it possible to duplicate any printing room condition between temperatures of 70 degrees Fahr. and 85 degrees Fahr. and relative humidities between 35 per cent and 65 per cent, has been completed at the Hopper Paper Company, Taylorville, Illinois. Any specified condition, within the ranges stated, may be established within twenty minutes and maintained within a variance of one degree of temperature and one per cent of humidity.

The installation, designed by the Perfecting Service Corporation of Chicago, permits the company to sheet, inspect, trim and pack paper for shipment in atmospheric conditions exactly the same as those of the printing plant to which it is to be shipped. The equipment for the new finishing room was furnished by the Carrier Corporation of Syracuse, New York.

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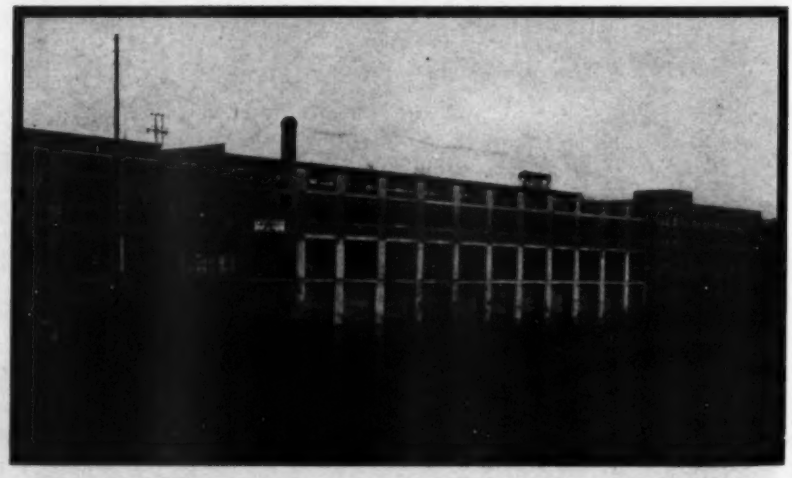
## A P P A SPONSORS AID FOR FINLAND

The American Paper and Pulp Association has announced the formation of an Industry Committee set up for the purpose of collecting funds to be sent to Finland through the Finnish Relief Fund, Inc., the relief agency which is headed by Herbert Hoover. Edgar Rickard, president of the Pejepscot Paper Company is assisting Mr. Hoover and the newly-formed Industry Committee will work directly with Mr. Rickard.

Three plans for raising funds have been considered by the Committee as having the most merit. These are: (1) solicitation of direct company contributions; (2) solicitation of personal contributions from company executives and administrative officers, and (3) the collection in small amounts from mill and office employees.

Members of the Committee are: D. C. Everest, Marathon Paper Mills Company, chairman; R. C. Mateer, Scott Paper Company; G. W. Sisson, Jr., Racquette River Paper Company; J. L. Riegel, Riegel Paper Corporation, and R. B. Wolf, Pulp Division, Weyerhaeuser Timber Company.

It is requested that all funds be forwarded to the American Paper and Pulp Association and that all checks be made payable to Finnish Relief Fund, Inc.



**New office building and plant addition of Menasha Products Div., Marathon Paper Mills Company, Menasha, Wis.**

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# BRIEFS

▶▶▶ AN ADDITION IS BEING BUILT to the wood room of the Canadian International Paper Company's mill at Hawkesbury, Ontario. The work is being done by the staff of the company. The Pulp Recovery Company is also contemplating building in Hawkesbury in the spring, it is reported.

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▶▶▶ CONSTRUCTION OF A NEW MILL has been started by the Acme Paper Box Company of Toronto, Ontario. The equipment will consist of an 80-inch combination cylinder and fourdrinier machine, six beaters and five jordans. The new plant will manufacture paper specialties.

▶▶▶ VANCOUVER RAYON SILKS, LTD., is planning a rayon plant in British Columbia. The company has engaged the services of Dr. Leo Berl, prominent Austrian chemical engineer, who has been in conferences with directors of the Vancouver company recently. Dr. Berl was a director of the National Scientific Union of Vienna and was also consulting chemical engineer for Harbins, Ltd., rayon manufacturers at Goldburn, near Manchester, England.

▶▶▶ THE GROUNDWOOD MILL of the Parker-Young Company at Livermore Falls, New Hampshire, is being completely overhauled and the company is making several operating changes. The mill has been closed since 1934. It has a capacity of 5,000 tons of air dry groundwood per year and is located on the Pemigewasset River, twenty miles south of the Parker-Young Company's pulp and paper mill in Lincoln, New Hampshire.

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▶▶▶ A MILL FOR THE manufacture of board and paper is now under construction by the Queen City Paper and Twine Company of Toronto, it is reported.


*READ A LEADER*

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# FINANCIAL

Paper company securities were a feature of the stock market upturn in the last days of 1939. International Paper, for instance, rose nearly $10 per share, on the basis of rumors of a still further advance in values.

Year end reports include extra dividends, employee bonuses, and, in many cases, a more satisfactory earning statement.

*A. P. W. Paper Company*—For the period July 1 to October 21, net earnings were $21,805, as against a loss of $1,735 in the third quarter of 1938.

*Bird & Son*—A fourth quarter common stock dividend of 25 cents per share has been voted, as compared with 10 cents in each of the first three quarters.

*Champion Paper and Fibre Company*—For the twelve weeks ending November 12, net income was $405,428, as against $162,848 for the same period in 1938. A 10-cent dividend is the first since February, 1938, when 25 cents was paid.

*Continental-Diamond Fibre Company*—Profit for the quarter ending September 30 was $22,607, as against a loss of $166,794 in the same quarter of 1938,

*Crown Zellerbach Corporation*—Net earnings for the six months ending October 31 were $3,662,982, as compared with $2,338,708 for the same period in 1938. An interim dividend of 25 cents is in addition to the quarterly dividends of 12½ cents.

*Flintkote Company*—A dividend of $1 per share is the first since the 60 cents paid in December, 1938.

*International Cellucotton Company*—Extra payment of $2 per share, in addition to regular 37½ cents quarterly.

*Kimberly-Clark Corporation*—Extra dividend of 25 cents per share, bringing year's total to $1.75, as against $1 on the common in 1938.

*Marthon Paper Mills Co.*—Net profits for the fiscal year ending Oct. 31 were $592,474, as compared with $267,135 in 1938.

*Rayonier, Incorporated*—Net income for the quarter ending October 31 was $652,636, as against $64,894 for the same quarter of 1938. A dividend of 50 cents on the common shares is the first dividend payment since the 25 cents paid July 1, 1938.

*Scott Paper Company*—A new issue of 30,000 shares of $4 cumulative preferred stock will be sold, to provide for improvements in the plant, purchase of stock in the Brunswick Pulp and Paper Company, and for the redemption of $900,000 outstanding 3¼ per cent convertible bonds.

*United Paperboard Company*—For the quarter ending August 26, the net loss was $42,598, as compared with a profit of $12,501 for the same period in 1938.

*S. D. Warren Company*—A dividend of 50 cents per common share is an increase of 25 cents of the previous three quarterly payments.

*West Virginia Pulp and Paper Company*—Net income for the year ending October 31 was $1,093,879, as against $260,353 for the preceding year. At the same time, the company set aside for depreciation $2,814,526, the largest such allocation in its history.

*Whitaker Paper Company*—Payment of $1, bringing year's total to $3, as against $4 in 1938.

**New York Stock Exchange—Stocks**

| | Closing Price Dec. 31, 1939 | High and Low Prices for 1939 High | Low |
|---|---|---|---|
| A.P.W. Paper Co | 4 | 4 | 1⅛ |
| Celotex | 10⅛ | 19⅛ | 7⅞ |
| Same Preferred | 61 | 72 | 58 |
| Certain-teed | 6⅝ | 13 | 5⅜ |
| Same Preferred | 35 | 47½ | 22 |
| Champion P & F Co. | 25 | 30 | 17 |
| Same Preferred | 100 | 105 | 98 |
| Container Corp. | 16⅜ | 17¼ | 9⅛ |
| Cont. Diamond | 7¼ | 10⅜ | 5 |
| Crown Zellerbach | 16⅞ | 17⅝ | 9 |
| Same Preferred | 89½ | 94 | 75 |
| Dixie Vortex | 11¾ | 13½ | 9¾ |
| Same "A" | 34½ | 35¼ | 30 |
| Flintkote | 19⅝ | 31½ | 15 |
| Robert Gair | 3⅜ | 5⅜ | 2 |
| Same Preferred | 15⅜ | 18⅞ | 7½ |
| Gaylord Container | 13 | 18¾ | 9⅜ |
| International P & P | 14 | 14¾ | 6⅜ |
| Same Preferred | 56½ | 57⅜ | 25¼ |
| Kimberly-Clark | 38 | 38 | 20 |
| MacAndrews & Forbes | 34⅜ | 35 | 28 |
| Masonite | 36¾ | 57½ | 30 |
| Mead Corp. | 11¼ | 14⅛ | 6 |
| Paraffine Cos. | 40½ | 60½ | 36 |
| Same Preferred | 100 | 104 | 92 |
| Rayonier | 18⅞ | 19 | 6⅝ |
| Same Preferred | 28½ | 28¾ | 12¼ |
| Scott Paper | 48⅛ | 50⅛ | 44½ |
| Sutherland Paper | 29¼ | 30½ | 22¾ |
| Union Bag & Paper | 13 | 13⅛ | 6 |
| United Paperboard | 5 | 7⅛ | 3¾ |
| U. S. Gypsum | 83¼ | 113 | 65¼ |
| Same Preferred | 173½ | 180 | 145¾ |

**New York Stock Exchange—Bonds**

| | | | |
|---|---|---|---|
| Celotex 4½% | 87½ | 97 | 76 |
| Certain-teed 5½% | 73½ | 86 | 68¼ |
| Champion P & F Co. 4¼% | 104¾ | 104⅜ | 100⅜ |
| Container Corp. 5% | 102¼ | 102¼ | 96 |
| Inter P & P Co. 5% | 97⅜ | 97⅜ | 82⅞ |
| Same 6% | 103 | 103 | 93 |
| Mead Corp. | 105 | 106¼ | 101¼ |

**New York Curb Exchange—Stocks**

| | | | |
|---|---|---|---|
| Am. Boxboard | 6⅞ | 9⅜ | 5 |
| Brown Co. Preferred | 27⅝ | 29¼ | 7¼ |
| Det. Paper Prod. | 1 | 2¼ | ⅞ |
| Great Northern | 44 | 45 | 35 |
| Hummel Ross | 5½ | 5⅞ | 2⅝ |
| Nat. Container | 10 | 10⅝ | 5 |
| St. Regis | 3 | 4½ | 1⅝ |
| Taggart | 6 | 6⅝ | 2⅝ |
| United Wall Paper | 1⅜ | 2¾ | 1½ |

The year ended in Wall Street with paper stocks affected favorably by the falling off in European imports at nearly the high point of the year. Companies which have been dependent on foreign pulp were not so favorably affected, and securities of the companies making building papers in many cases closed the year lower than at the beginning of the year, or at least below the high points of the year.

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# NEW ENGLAND PULP NEWS

The heavy arrivals of wood pulp at Portland, Boston and New London—and at Albany before the river navigation ended—has allayed all fears of any pulp shortage this winter. The agreement with Germany has released many vessels bound to the New England coast and while there have been delays running to a month or more in deliveries, no consumers in the past month have been in desperate need. However, there has been a willingness to accept pulp as rapidly as it could be shipped out from ports of arrival. In a few cases where mills have prudently maintained a substantial reserve at all times, there has been backup of pulp on the piers which should only be of temporary duration.

Substatntial demand is not expected, except for groundwood, and producers have no difficulty contracting every pound of it that they can offer. They can easily secure the equivalent of around $40 to $42 per ton ex-dock, which explains the continuance of sales at $45 to $50 per ton delivered to eastern consumers.

Most of the bleached sulphite recently sold has been at $60 ex-dock basis both for domestic and foreign pulp, but some of the more choice foreign brands are quoted at $64 and certain of the unbleached sulphite brands have commanded up to $52. For a spot tonnage of easy bleaching, sulphite the price of $55 was asked recently.

One might suppose that a possible shortage of kraft would be feared less than of sulphite because of the enormously increased potential production in this country. Yet we find foreign kraft selling at $42 dock with some brands of the light and strong type quoted at $45. There is virtually no bleached kraft available to northeastern converting mills below $65 ex-dock.

New England buyers have heard that Finnish vessels carrying Finnish pulps have been able to load and sail during December.

ADVERTISING PAGES REMOVED

# Editorial

## FORECASTING 1940

▶▶▶ WHEN WENDELL WILKIE, the dauntless champion of good business, was closing his masterful address to the National Association of Manufacturers in New York City last month, he told them that "life begins in forty". With the unalterable conviction of irrepressible optimists, we heartily subscribe to Mr. Wilkie's forecast.

That 1940 will be a bigger, brighter, better business year than 1939 was, is already amply foreshadowed by all commercial and industrial indices. Never, in the past decade, has the outlook for the return of this country to good healthy business been so certain and clear as it is now.

It is of prime importance for the betterment of the world that this country become more and more prosperous because to this country alone, do all of the nations of the world look for the material help which will bring prosperity to them.

The outbreak of the war in September last served one big beneficent purpose. It roused industry and commerce out of the lethargy and rut of inactivity into which it had sunk—nothing less than the declaration of war could have produced the change. Contrary to general opinion, the war did not bring orders for commodities made in the United States on any such scale as the World War of 1914 did.

Better, bigger business for 1940 was in the making and under way by midsummer of 1939. Inventories in all lines and in all positions were at unprecedented low figures, due to the intense hand-to-mouth buying, which had succeeded the Roosevelt depression, which followed his celebrated Chicago speech on the bridge at noonday in September of 1937. Not only were stocks of commodities low, but prices also were at the lowest in years when compared to costs of production. Hence, when the war declaration suddenly burst upon the incredulous merchants and producers, it found them suddenly avid in their haste to obtain goods at the then-going prices. The turn had come. It was dead certain profit for them to load up as heavily as possible at the then-prevailing prices.

While the United States is the greatest producer of pulp and paper in the world, it is also the greatest consumer of that industry's products. And while there had been a substantial increase in pulp production during 1937 and 1938, yet, the blockade of the Baltic and North Seas by the English and French navies, which became immediately effective, shut off the delivery of hundreds of thousands of tons of this vital raw material bought for delivery during the fall months to the United States buyers and buyers in other countries also. This drove the domestic mills to seeking supplies elsewhere and also sent the buyers in other countries scurrying for coverage. There was but one place to go—the United States, which was immediately confronted with a demand greater than its ability to supply. Therefore, it was not a fictional phrase that one pulp and paper mill used when it announced to the trade in September that "our product is sold out for the duration of the war."

So, the paper industry looks into the face of 1940 with confidence that capacity business at reasonable profits is ahead and will continue until war ceases.

Should peace ensue at an early date, the paper industry will continue to enjoy a constantly increasing demand for its products, due not to shortage of supplies, but rather to increasing usages of its product as substitute raw materials for the production of thousand of other commodities.

## PAPER WEEK

▶▶▶ TO PAPERMAKER'S throughout the United States, one week in February of each year has come to be known as *Paper Week*. During that week, papermakers from all over this country, in fact, from around the world gather in New York City, because the activities of *Paper Week* have taken on a more or less international aspect. It is a time when the American Paper and Pulp Association, the Technical Association of the Pulp and Paper Industry, and other affiliated organizations assemble in annual convention. The meetings this year are scheduled for the week of February 19. The American Paper and Pulp Association will meet, as has been its custom for many years, at the Waldorf-Astoria; while the meetings of the Technical Association are to be held at Hotel Roosevelt, an innovation that began last year, rather than co-meeting with the parent association.

It will be the sixty-third annual convention of the American Paper and Pulp Association; the twenty-fifth annual meeting of the Technical Association.

With each passing year, these meetings chronicle the accomplishments of the industry during the year just past, and set new goals for the year ahead. They make for better mutual understanding of the problems of the industry. They renew old friendships and kindle new ones. The benefit to be derived from attending any of the meetings, whichever are in line with one's work, is inestimable.

Keep *Paper Week* in mind and, if your work will allow you, arrange to be in New York for the week of February 19.

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## SOMETHING PERSONAL

HOW CAREFULLY DO YOU READ your copy of THE PAPER INDUSTRY AND PAPER WORLD? Do you read each issue from cover to cover (maybe that is asking too much); or do you turn over the pages nonchalantly until some advertisement, subject heading, illustration, or news item commands your attention and causes you to find out what it is all about? Do you read for inspiration, for news of the industry, or for information which will make you more proficient in your job; or is it for a combination of all three?

If you read for information, do you trust your memory to retain all that you read? In other words, after reading a copy of the magazine, do you throw it away, or do you give it to some one who is interested in it?

If you do not trust your memory to retain all of the material presented in the magazine, how do you preserve that which you desire to save? Do you file each complete issue and perhaps bind accumulated issues into volumes or do you simply file the material in each issue which appeals to you most so that it may be referred to conveniently at any time.

Naturally, we strive to include in each issue of the magazine information that will interest you personally; some of it perhaps only for a time and other material for an idefinite period. How well our job has been done in so far as you are concerned can be answered only by you.

Not being able to visit each of our readers personally, an experience which most certainly we should like to have, we are wondering as a new year begins just what you liked about the material presented last year, what you did not like; and possibly what you might like to see treated during the next twelve months.

If you would let us know what you enjoyed and did not care for, and what, in your estimation, would make our publication more interesting and more helpful, we would be grateful. Such word from you would permit us to serve you more intelligently and make 1940 a banner year—editorially as well as otherwise.

# CURRENT THOUGHT

## RETROSPECTION and INTROSPECTION

**WILLIAM SIBLEY**

▸▸▸ THANK GOODNESS, the Terrible Thirties are over. I'm writing this on the last day of the decade. For the most part, the Thirties will go down into history unlamented. I hesitate to recount some of the things that happened during the past ten years. They are terrifying to a degree that makes us doubt both our sanity and our civilization.

We started the decade on the skids. A two-year toboggan that landed us in a bank moratorium and the poor house. Because of that long slide we still hear the feeble whimpers of babies who don't have bread and milk. In this country we are too civilized to permit people to starve. But there are millions so undernourished that their bodies have no resistance to disease. And so they die—of starvation.

During the past ten years we have had World Fairs—and World Fires. We have witnessed the invasion of Ethiopia, Austria, Czechoslovakia, China, Poland, Finland—and have done nothing about it. And we could have, and should have, done something about it. I *still* believe I was right when I said, on this page several years ago, that the time to put a halter on all dictatorships was after Mussolini became very busy in his African conquest—then close the Suez Canal to him. Had England done that, the fear of consequences would have so chilled the "bravery" of other dictators that there would have been no such thing as an Austrian or Sudetenland grab. And Europe wouldn't now be involved in war.

The League of Nations is no more. Neither are several million Jews. Neither are the civil liberties of all Russians, Germans, Poles, Italians, Austrians and Czechs. Yet we shrug our shoulders and do nothing about it.

During the past ten years we have been bombarded by such economic panaceas as the Townsend Plan or the California-made idea of Thirty Dollars Every Thursday. Very few people sincerely believe such plans would work, but the furore that accompanied their advocacy has resulted in costly compromise in the form of state pension laws, federally sponsored "social security," and other tax impositions. And these aren't working either. Just this week I was chatting with a venerable man (82 years old) who works in a printing plant for $110 per month. I asked him why he didn't apply for his rightful social security. He informed me that his compensation would amount to $15 per month. Quite naturally he is unwilling to trade his $110 pay-check for $15 worth of pension.

During this crazy decade we have been stuffed with Washington-brewed alphabet soup. Remember the NRA? With its Blue Eagle? Blue was a very appropriate color for that organization.

During the recent decade we have witnessed the demise (not always with proper burial) of the *Literary Digest, Delineator, Pictorial Review, World's Work, Review of Reviews, System, Woman's World, Saturday Blade, Chicago Ledger, Ballyhoo* and *Ken.* In their place we have *Life, Look, Pic, Click, Fortune, Esquire, News-Week, Coronet, You, Glamour, Madamoselle,* and a whole flock of movie magazines and blood-and-thunder pulps.

Looking forward, one can only say that 1940 will be a year of decision for the American people. One of the things we must do this year is to nominate political candidates and elect a President. That will be a decision of paramount importance and it should command the serious thought of everyone. We Americans still have control of our government. The consent of the governed is still required. It is up to us to elect political parties and presidents.

Another, and far more important decision we may be called upon to make during the ensuing year is that of "to be or not to be" an active participant in the European mess. Will we get into the war, or will we retain our neutrality? At this time that question is unanswerable. No one is insane enough to sincerely want war. Yet no one should discount the force of advertising and when untoward events make it possible to turn on the propaganda machine—look out! Propaganda is powerful. Powerful enough to make sensible men believe base untruths and ministers to preach the gospel of hate. Thinking in terms of the European war let us memorize the clearly truthful statement of George Washington, in his farewell address, when he said: "Europe has a set of primary interests which to us have none or a very remote relation. Hence she must be engaged in frequent controversies, the causes of which are essentially foreign to our concerns. Hence, therefore, it must be unwise in us to implicate ourselves by artificial ties in the ordinary vicissitudes of her politics or the ordinary combinations and collisions of her friendships and enemies."

ADVERTISING PAGES REMOVED

# CHLORINATION PULPING of Spruce Wood

**CARL T. WELTE[1] and C. E. LIBBY[2]**

▶▶▶ IT HAS BEEN FULLY DEMONSTRATED that chlorination pulping is superior to any other commercial chemical process in the treatment of the annual plants such as the cereal and other plant straws, esparto grass, stalks of cotton, corn and other textile plants, bagasse from sugar cane, and various cellulose bearing wastes from the farm. It also seems to offer some promise of successful application in the treatment of the softer non-resinous woods such as poplar and birch. However, the high consumption of chlorine and the long periods of treatment required in applying this process to the pupling of resinous woods—spruce and pine—had led to the conclusion that it is uneconomical as compared with other chemical processes already employed for the pulping of these woods.

The present investigation was undertaken to determine if spruce wood could be pulped successfully by a chlorination process.

The use of chlorine for bleaching straw and esparto, although not brought into prominence until recently, is evidently far from new. According to Bartholow [*Paper Trade Journal* 80, TAPPI Sect. 57 (March 5, 1925)], who has reviewed early history of chlorination, Von Kurrer, in 1800, gave a complete description of the use of chlorine water in bleaching animal and vegetable tissues. It is evident also that he was well acquainted with the preliminary alkali cook before chlorination.

A very recent discussion of gas chlorination in cellulose manufacture has been given by Pomilio [*Ind. Eng. Chem.* 31, 657-662 (1939)]. Other reviews are found in appropriate journals. Hence an intensive literature survey appears unnecessary.

The technical application of the chlorination process for pulp production is carried out at present by two methods: (1) Using chlorine water (2) using chlorine gas. The principal representative of the first group is the process of DeVains, while the second group is represented by the process of Cataldi-Pomilio. These two processess differ chiefly in the mechanical details, alkali pre-treatment, and the method of applying the chlorine. The accompanying flow charts are self-explanatory (Figures 1 and 2).

## EXPERIMENTAL PART

### I. Scope of the Laboratory Work

The following points were considered: (1) Minimum alkali requirement for obtaining a pulp suitable for chlorination. (2) Minimum chlorine requirement for producing a good white pulp when chlorinating in single stages at room temperature and atmoshperic pressure. (3) Optimum consistency of pulp during chlorination treatments. (4) Comparison of chlorine water and gaseous chlorine pulping. (5) Comparison of single stage and multi-stage chlorinations.

(1) Champion Paper and Fibre Company. (2) Professor of Pulp and Paper Manufacture, New York State College of Forestry.

**This work is a summarized report of the thesis submitted by Carl T. Welte for the M. S. degree at the New York State College of Forestry in 1933. A number of recent requests from industrialists, and the fact that investigators in the U. S. S. R. have recently made chlorination pulping studies on coniferous woods (L. P. Sherebov, C. A. Kan, and W. N. Komarovski Bumazhnaya Prom. 16, No. 7, 8-20 (Oct. 1937), have caused us to submit it for publication. It should be emphasized that the results are those of orientating experiments; that the equipment used was far from ideal, and that the conclusions are given with due reservations. Attention is also drawn to the work of M. H. Kang and C. E. Libby, [Cellulose 1,25-9; 50-58 (1930)] on the chlorination process as applied to birch wood. EDITOR'S NOTE.**

### II. Chlorination Apparatus

#### A. CHLORINE WATER PROCESS

##### 1. Absorption System

The chlorine hydrate or chlorine water was prepared by absorbing the chlorine in water at room temperature, in a system consisting of seven five-gallon carboys (calibrated in liters), a chlorine cylinder equipped with a needle valve, a bottle of concentrated sodium hydroxide solution, and a bottle containing anhydrous calcium chloride to prevent corrosion of the valve. All connections are shown in Figure 3. Each carboy contained only about 18 liters of water.

The amount of chlorine absorbed by the water varies with the temperature and pressure. At 22 deg. C. and atmospheric pressure, one liter of water will absorb about seven grams of chlorine. After the first two carboys had absorbed approximately seven grams chlorine per liter at room temperature, the needle valve on the chlorine cylinder was closed, tubing clamps being employed simultaneously to prevent the sodium hydroxide solution from being sucked back into the chlorine water and the gas pressure in the carboys forcing chlorine water into the calcium chloride bottle. As soon as the tubes had been closed the first two carboys were removed. The replacement bottles of water were then connected up to the exhaust ends of the absorption system. The exact amount of chlorine absorbed in the water was determined volumetrically with 0.1*N* sodium arsenite solution.

##### 2. Chlorination

The chlorinator having a capacity of 10 gallons, was constructed of acid resistant stoneware (Figure 4). It consisted of a round bottom vessel with a cover and stirrer. The cover was constructed with a packing box for the stirrer, and was ground to make a tight joint with the chlorinator body. A rubber gasket was cemented to the cover where it contacted the body. The cover was held firmly to the body by eight screw clamps. On either side of the packing box on the cover was a small opening for the inlet of chlorine hydrate. The vessel which was used in this investigation at atmospheric pressure only, was supported on an iron ring with trunnions on each side so as

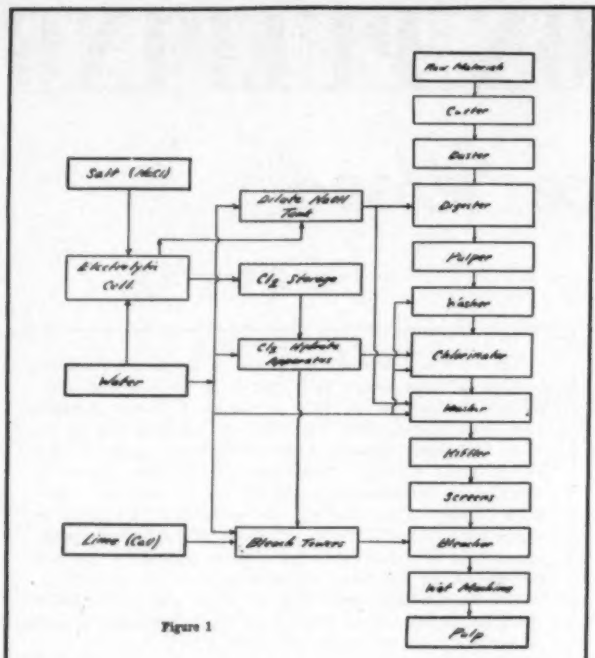


Figure 1

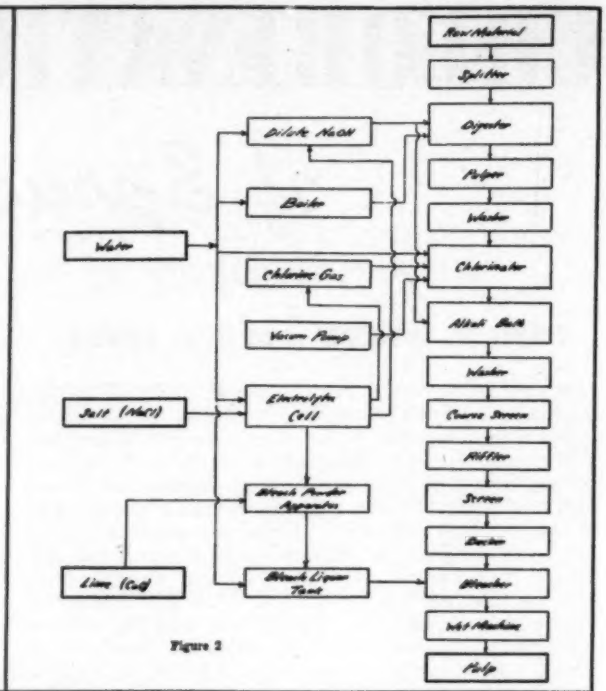


Figure 2

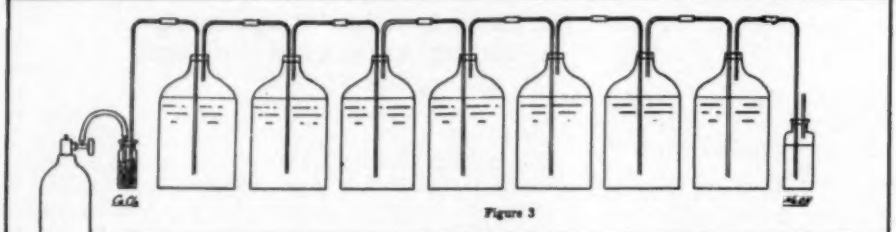


Figure 3

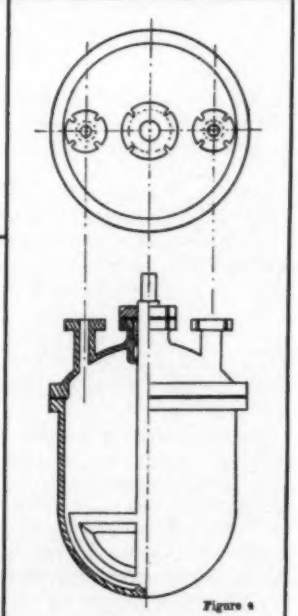


Figure 4

Figure 1—Diagram of the De Vains Process

Figure 2—Diagram of the Cahaldi-Pomilio Process

Figure 3—Chlorine Water Absorption System

Figure 4—Stoneware Chlorinator

Figure 5—Details of Burette for Liquid Chlorine

Figure 6—Gaseous Chlorination Apparatus

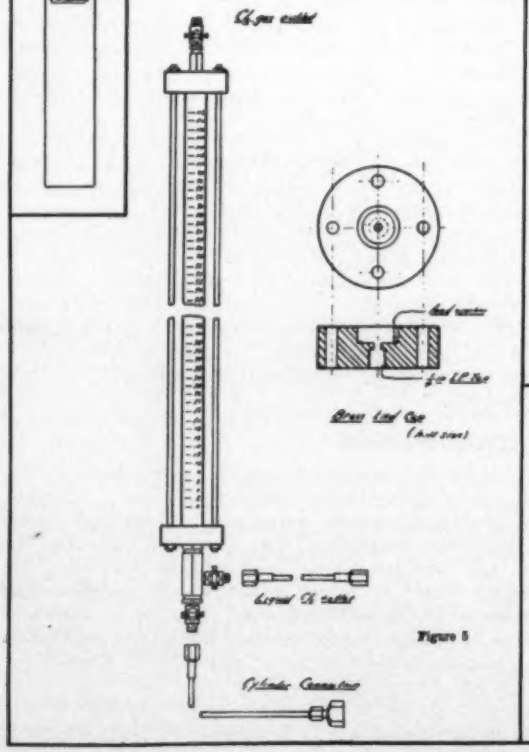


Figure 5

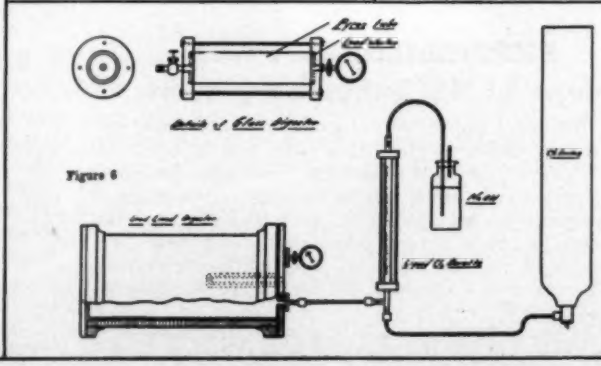


Figure 6

to permit tilting. The stirrer was belt driven through bevel gears at 80 r.p.m.

After charging the chlorinator with half stock, chlorine hydrate was introduced from a carboy through the top inlet by means of compressed air, and enough water was then added to bring the concentration to the desired ratio. The inlet was then closed and agitation started. When it was desired to test for the exhaustion of the chlorine, the stirrer was stopped, one of the top inlets opened and a sample of the liquor pipetted out by means of a glass tube. The presence or absence of chlorine in the sample was then determined by the use of starch iodide paper.

### B. CHLORINE GAS PROCESS

#### 1. Measurement of the Chlorine Gas

After preliminary trials a method of measurement was suggested by R. S. Hatch now research director of the Weyerhauser Timber Company, Longview, Washington. This method made use of a pressure burette which could be applied to the measurement of either gaseous or liquid chlorine.

The burette (Figure 5) consisted of a graduated thick-walled Pyrex glass tube clamped in a vertical position between two brass end caps. The top cap was connected directly to a single needle valve so that chlorine gas could be removed as desired. The bottom cap was connected to a tee.

The bottom outlet of the tee was fitted to a needle valve which in turn was fitted to a length of flexible copper tubing. The end of this tubing had an adapter to thread onto a 100-pound chlorine cylinder. The side outlet of the tee also was joined directly to a needle valve which connected through a length of flexible copper tubing to the inlet valve of the chlorinator. The needle valves (Hoke 309) were equipped with Monel metal stems, and all joints of the burette were silver soldered.

A rubber tube connected the top needle valve to a wash bottle containing sodium hydroxide. The top needle valve was opened slightly and the liquid chlorine admitted from an inverted chlorine cylinder, through the bottom needle valve, until it filled the burette. Both needle valves were then closed.

Gaseous chlorine was removed via the top valve, while liquid chlorine was removed through the side valve of the tee. The volume of the chlorine removed was measured by the difference in levels of the liquid chlorine within the burette.

The weight of liquid chlorine per unit volume varies almost inversely with the temperature. At 23 deg. C. one cc. of the liquid chlorine weighs 1.398 grams. From the temperature of the liquid chlorine which soon became equalized with room temperature, and the weight per unit volume, obtained from critical tables or tables supplied by chlorine manufacturers, it was possible to calculate the volume of chlorine necessary to give the desired weight of either the gaseous or the liquid chlorine.

#### 2. Chlorination

The gaseous chlorination treatments were carried out in a horizontal, rotary, lead lined, steel digester. (Figure 6) This digester was very similar to the digester used for the subsequently mentioned alkali cooks, having, however, in addition a lead lining. It differs also in having a pressure gauge and a needle valve on the cover, and having the thermometer well on the cover instead of on the bottom. The gauge contained a silver diaphragm which protected the gauge mechanism from corrosion by the chlorine. The capacity of this digester was approximately one cubic foot, and it rotated at 10 r.p.m. No heat was applied to the digester. This digester is hereafter referred to as the pressure chlorinator, or chlorination digester.

The digester was charged with halfstock, the cover bolted on and the flexible copper tube from the burette connected. One-third of the total chlorine required for that stage was then admitted, the flexible tube disconnected and the digester rotated for approximately two minutes. Then the rotation was stopped and another third of the chlorine admitted. After another two minute rotation period the remaining third of the required chlorine was admitted. This insured even chlorination.

To observe the reaction of the gaseous chlorine under pressure on the halfstock, a small glass digester was constructed. This digester (Figure 6, Insert) consisted of a one-eighth-inch length of two-inch diameter heavy walled Pyrex glass tubing clamped between two recessed brass end caps; a soft lead washer acting as the seal between the glass and the caps. One of the caps was equipped with a needle valve, while the other cap had a protected pressure gauge similar to the gauge used on the larger digester. Chlorine was admitted to this digester from the measuring burette. The temperature rise was determined from a thermometer placed inside the digester. This digester withstood pressures up to 150 pounds per square inch without leaking.

## III. Minimum Alkali Requirement of Preliminary Treatment

The severity of treatment and minimum alkali consumption are dependent upon the raw material, while the maximum alkali consumption is dependent only upon the economics of the process and the pulp characteristics desired. In this investigation the minimum alkali (NaOH) requirement was that required for cooking spruce chips so that after a subsequent mechanical treatment in a pulper they are in a state suitable for chlorination.

### A. PREPARATION OF THE RAW MATERIAL

A number of barked spruce logs (approximately six inches diameter) sufficient to furnish all the wood required for the complete investigation, were reduced to half-inch chips by a laboratory chipper. The chips were screened and well mixed so that their removal at any time (from air-tight containers) would be representative of the whole, and any variations in annual ring width, pitch content, and other characteristics of the separate logs would not cause variations in the results.

### B. COOKING

The alkali treatments were carried out in a small, externally heated horizontal, rotary steel digester of one cubic foot capacity, which was charged with 2700 grams of chips based on oven dry weight together with the necessary amount of commercial flake caustic (76 per cent sodium oxide) and sufficient water to obtain a liquor ratio of eight to one. The various concentrations of the caustic soda were 2, 4, 6, 8 and 10 per cent, based on the oven dry weight of the chips. A control cook using water only was also included.

The total cooking time was six hours, one hour bringing up to a pressure of 100 pounds (170 deg. C.) and five hours at 100 pounds pressure. At the end of the six hours the digester was blown. After removal of the digester cover the chips were discharged into a colander covered with cheesecloth. The treated chips still maintained their original form but in the case of the 8 per cent and 10 per cent cooks, they were slightly softened. The other alkali concentrations gave comparatively hard chips. Titration of the black liquor showed the caustic was practically consumed in every case.

Poor results obtained in subsequent chlorinations necessitated another shorter 10 per cent sodium hydroxide cook,

one hour being used to bring the pressure up to 150 pounds. The chips were washed with hot water and then were broken into halfstock in a beater. Hot water at a temperature of 55-60 deg. C. was used in the beater.

### C. BREAKING-UP OF THE TREATED CHIPS

Since neither chlorine water or chlorine gas would penetrate sufficiently to pulp the treated wood in chip form, a mechanical defibering or maceration was necessary. Usually this is accomplished by the use of a pulper or kneader, but at the time this equipment was not available, and a substitute had to be used. This was a 15 pound laboratory beater which served the purpose quite well. The beater roll was adjusted to clear the bedplate by about one-fourth inch and then as the chips were broken up the roll was lowered until it just cleared the bedplate. The chips were thus broken down into a coarse halfstock. The time requirement for this operation depended upon the percentage of caustic soda used, but usually varied from 30 to 45 minutes. Personal observation determined the fineness of the halfstock and the end of the breaking operation.

The halfstock was washed, pressed, and thoroughly mixed. After weighing and determining the moisture content it was stored in Mason jars until ready for chlorination.

### D. CHLORINATION

Samples of each of the five different halfstocks were treated with chlorine water equivalent to a single-stage chlorination of 60 per cent chlorine (based on the original weight of chips). The stock was then washed, pressed out and treated with a cold two per cent solution of caustic soda for 30 minutes, followed by a hot and cold water washing.

Similar samples of each halfstock were subjected to a two-stage chlorination; a first stage of 30 per cent chlorine, followed by a second stage of 20 per cent chlorine, the chlorine being furnished by chlorine water. After each chlorination the stock was washed, pressed out and then subjected to a cold two per cent sodium hydroxide solution treatment for 30 minutes, followed by washing with hot and cold water and pressing. The water wash before the sodium hydroxide treatment was necessary to remove the large amounts of hydrochloric acid formed during the reaction.

The chlorination apparatus employed was the same as that previously described in this report.

### E. RESULTS

1) Single-stage—The chlorinated stocks all contained an excessive quantity of shives, the water cook and the two per cent sodium hydroxide cook having the most. The 10 per cent sodium hydroxide cook had the least.

2) Two-stage—Less shives remained in the pulp with this treatment than in the single-stage process. However, there was still an excessive quantity in all pulps except that obtained by the 10 per cent sodium hydroxide cook.

3) A second 10 per cent sodium hydroxide cook on spruce chips, shorter, but at a higher pressure (one hour bringing up to 150 pounds and four hours at 150 pounds) gave a stock having a better appearance after chlorination, *so this preliminary alkali cook was used in preparing all halfstocks used in the remainder of this investigation.*

## IV. Minimum Chlorine Requirement

Halfstock, equivalent to 500 grams of oven dry chips, was treated in the stoneware chlorinator with 100 per cent (500 grams) of chlorine as chlorine water, which was completely exhausted only after a period of over 36 hours. The resulting stock, yellowish in color, was pressed out to approximately 25 per cent oven dry and then treated with a two per cent sodium hydroxide solution at 100 deg. C. for 30 minutes. A coarse dark brown stock remained after completely washing out the caustic liquor with hot water.

A similar amount of halfstock (approximately 25 per cent oven dry) was then treated in the chlorination digester with 100 per cent (500 grams) of chlorine gas. Pressure inside the digester immediately went up to 60 pounds per square inch, while a maximum temperature of 55 deg. C. was reached. After rotating for eight hours only a trace of chlorine remained in the digester. The brilliant orange colored chlorinated stock was washed with hot water pressed out to approximately 25 per cent oven dry, and then treated with a two per cent sodium hydroxide solution at 100 deg. C. for 30 minutes. A coarse brown stock remained after complete washing.

From this experimental work it was concluded that it is impossible under our conditions to produce a white pulp from spruce wood, which has had an alkali pretreatment of 10 per cent or lower (based on oven dry chips) in a single stage chlorination followed by a dilute alkali boil. An excess of chlorine, as high as 100 per cent on the original chips, over a long period of time does not produce further chlorination nor does it give a more highly purified pulp. This is true for both chlorine water and chlorine gas treatments.

## V. Optimum Consistency for Chlorination

The maximum consistency of halfstock during chlorine water treatment is determined by the percentage chlorination treatment being given to the halfstock. The yield of halfstock from the 10 per cent alkali cooks averaged 75.2 per cent based on the oven dry raw material. Considering the halfstock as 25 per cent oven dry, the chlorination treatment as 20 per cent chlorine based on the oven dry raw material, and the concentration of chlorine in chlorine water as the maximum of seven grams per liter, it is evident that the maximum consistency will be approximately 2.4 per cent oven dry. Similarly, during a 10 per cent chlorine water treatment, the maximum consistency would be 4.5 per cent oven dry. During gaseous chlorination treatments, however, the consistency of halfstock is readily controlled over a wide range. The results of this investigation appear to favor a consistency of approximately 25 per cent oven dry for gaseous chlorination.

Halfstock of the 10 per cent sodium hydroxide cook, to the equivalent of 500 grams of chips, was allowed to air-dry until 35 per cent oven dry. It was then treated with 20 per cent gaseous chlorine based on the original chip weight. On introduction of the chlorine gas the temperature rose to 65 deg. C., but no pressure was indicated on the gauge. On examination, the stock appeared powdery, and apparently the fiber structure had been destroyed. The chlorine gas was exhausted almost immediately upon its introduction into the digester.

Similar treatments were given other samples of the same halfstock at 25 per cent and 15 per cent oven dry consistencies. During the 25 per cent consistency chlorination, the chlorine was exhausted in two minutes and the temperature rose to 47 deg. C. During the 15 per cent consistency chlorination, the chlorine was exhausted in 30 minutes and the temperature rose to approximately 33 deg. C. In both of these cases the stock appeared chlorinated to the same extent, which gave the 25 per cent consistency an advantage of a shorter chlorination time.

## VI. Comparison of Chlorine Water and Gaseous Chlorine Pulping

This comparative investigation of the two chlorination pulping methods was based on the use of the minimum alkali pretreatments of 10 per cent sodium hydroxide as determined previously.

Preliminary work showed that different methods of application of a constant total amount of chlorine resulted in a wide variation of quality in the pulps produced. In this investigation the constant total chlorine was kept at 30 per cent

(based on the weight of oven dry raw material), while the number of stages, chlorine treatment of the stages, and the sequence of the stages were varied. *A constant total of 30 per cent chlorine was selected since it was the approximate minimum of chlorine required to produce a raw appearing pulp by a single stage chlorination of the minimum alkali halfstock.*

In addition to being a comparison of the chlorine gas and chlorine water pulping processes, this investigation also serves to bring out the influence of various factors on each of these pulping methods.

In order to furnish "controls" from which the quality of the chlorine prepared pulps could be judged, two non-chlorine pulp were also treated. The first of these was a pulp produced by a 25 per cent caustic soda cook on the same spruce wood used for preparing halfstock for chlorination. The second was a commercial unbleached Mitscherlich sulphite spruce pulp.

## A. PREPARATION OF THE HALFSTOCK

The rotary steel digester was charged with 2700 g. of the spruce (based on oven dry weight) chips together with the necessary amount of commercial flake caustic and sufficient water to give a liquor ratio of eight to one. The concentration of the caustic soda was 10 per cent of the oven dry weight of the chips.

The total cooking time was five hours, one hour bringing up to a pressure of 150 pounds and four hours at 150 pounds (185 deg. C.). At the end of the five hours the digester was blown, the treated chips washed with hot water, and then broken up into a halfstock, in a laboratory beater as previously described.

The products of each of five such cooks were converted into halfstock and well mixed in the beater. Presscakes of approximately 25 per cent oven dry were formed and the moisture content and yield determined. The yield of halfstock from these five cooks averaged 75.2 per cent.

Twelve samples of the halfstock, each equivalent to one thousand grams of chips, were then weighed out, wrapped securely in cheesecloth, and stored in air-tight containers until ready to be chlorinated.

## B. CHLORINATION

The chlorinations were carried out on the halfstock samples (approximately 25 per cent oven dry) equivalent to one thousand grams of chips.

### 1. Chlorine Water

The halfstock was treated with chlorine water in the stoneware chlorinator. When the volume of water required for the chlorination treatment was more than the volume of the chlorinator, the halfstock sample was divided into two equal parts and each half was chlorinated separately, at 25-27 deg. C. (room temperature). At no time did the temperature of the stock during chlorination rise to more than 30 deg. C.

When the chlorine was exhausted the stock was removed from the chlorinator, washed with water, pressed to approximately 25 per cent oven dry, and then broken up and treated with an excess (12 liters) of one per cent sodium hydroxide solution at 100 deg. C. for 30 minutes with frequent stirring.

The stock was then washed with hot water until free from the brown colored alkali liquor, and pressed to approximately 25 per cent oven dry. Single stage pulps were screened, while the multiple stage pulps were chlorinated further. Complete details of the conditions and results of the chlorinations are included in Table 1.

### 2. Gaseous Chlorine

The halfstock sample (equivalent to one thousand grams of chips) at 25 per cent oven dry, was charged into the lead lined digester and the required amount of chlorine gas admitted. Notation was made of the temperature and pressure attained as well as the time required for the exhaustion of the chlorine.

When the chlorine was exhausted, the stock was washed and given the same alkali boil as given to the stock in the chlorine water process.

**Table 1—Chlorination Treatment**

| Sample No. | First Stage | | | | | Second Stage | | | | | Third Stage | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Per cent $Cl_2$ | Added as | Temp.* | Press.** | Time | Per cent $Cl_2$ | Added as | Temp.* | Press.** | Time | Per cent $Cl_2$ | Added as | Temp.* | Press.** | Time |
| 1† | 30 | hydrate | ..... | ..... | 11 hrs. | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 2†† | 20 | hydrate | ..... | ..... | 3½ hrs. | 10 | hydrate | ..... | ..... | 12 hrs. | ..... | ..... | ..... | ..... | ..... |
| 3 | 15 | hydrate | ..... | ..... | 2½ hrs. | 10 | hydrate | ..... | ..... | 8½ hrs. | 5 | hydrate | ..... | ..... | 14 hrs. |
| 4 | 10 | hydrate | ..... | ..... | 2½ hrs. | 10 | hydrate | ..... | ..... | 4½ hrs. | 10 | hydrate | ..... | ..... | 15 hrs. |
| 5 | 5 | hydrate | ..... | ..... | 1½ hrs. | 10 | hydrate | ..... | ..... | 2 hrs. | 15 | hydrate | ..... | ..... | 14 hrs. |
| 6† | 30 | gas | 48 | 10 | 1 hr. | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 7†† | 20 | gas | 47 | 0 | 2 min. | 10 | gas | 35 | 2 | 15 min. | ..... | ..... | ..... | ..... | ..... |
| 8 | 15 | gas | 47 | 0 | 2 min. | 10 | gas | 43 | 2 | 4 min. | 5 | gas | 30 | 4 | 3½ hrs. |
| 9 | 10 | gas | 47 | 0 | 2 min. | 10 | gas | 47 | 1 | 3 min. | 10 | gas | 30 | 10 | 4½ hrs. |
| 10 | 5 | gas | 30 | 0 | 1 min. | 10 | gas | 33 | 0 | 1 min. | 15 | gas | 35 | 12 | 5½ hrs. |
| 11 | 10 | hydrate | ..... | ..... | 1½ hrs. | 10 | gas | 38 | 0 | 1 min. | 10 | gas | 30 | 12 | 2 hrs. |
| 12 | 15 | gas | 47 | 0 | 2 min. | 10 | gas | 43 | 2 | 4 min. | 3 | bleach. | ..... | ..... | 3 hrs. |

*Temperature in C. deg. **Pressure in lb. per sq. inch.
†These cooks single stage only. †† These cooks two stages only.

**Non-Chlorine Pulps**

| | |
|---|---|
| 13 | 25 per cent NaOH Cook on Spruce (laboratory cook, 1 hr. up to 100 lbs., 5 hrs. at 100 lbs., 8:1 liquor ratio). |
| 14 | Mitscherlich Sulphite Cook on Spruce (Commercial pulp, Dexter Sulphite). |

## C. TREATMENT OF THE PULP

After thorough washing all shives and unchlorinated woody fragments were separated from the good pulp by a screening operation, using a small diaphragm screen with 0.008 inch slots.

Both the yields of screened pulp and of screenings were determined on aliquot portions. The screened pulp was stored in air-tight jars until ready for use.

## D. PULP TESTING

Screened pulp was prepared for chemical analysis by disintegration in a small mixer and then made into hand sheets which, without pressing, were allowed to air-dry for several days and then cut up into quarter-inch squares. Representative samples of each pulp for all of the chemical analyses and

moisture determinations were weighed out at the same time.

The results of the physical and chemical tests on the unbleached pulp are tabulated in Table 2.

The pulp testing methods employed in this investigation were as follows:

### 1. Strength Tests

The unbleached pulps were tested for maximum mullen and maximum tearing strength by means of the ball mill method which is as follows:

**a. Beating Test**—One hundred grams of air-dry pulp after soaking in two thousand cubic centimeters of water was hand kneaded and poured into an Abbe ball mill with a jar 11⅛x13⅜ inches, revolving at 56 revolutions per minute and carrying a charge of 1780 cc. of pebbles.

Aliquot samples were collected every 20 minutes of beating time and each of these corresponded to 150 cc. (or 5.0 grams of air-dry stock). Each sample was diluted to 450 cc. in a flask and shaken vigorously. Three hundred cubic centimeters were measured out and used for the freeness test. The fibers which are retained in the freeness tester together with the other 150 cc. were used for making one test sheet.

**b. Formation of Sheets**—The sheet machine used in this investigation has a mold 10 by 12 inches, and is otherwise completely described in "The Preparation of Fiber Test Sheets," Technical Association Papers, Series XIII, No. 1, May, 1930.

**c. Drying of the Sheets**—After pressing, the sheets were dried overnight at 70 deg. Fahr. and 65 per cent relative humidity. After drying, the weight of the sheets in grams to the second decimal place was determined on a sensitive analytical balance.

**d. Testing of the Sheets**—Testing was carried out at 70 deg. Fahr. and 65 per cent relative humidity. The Mullen strength figures are the averages of 10 tests on each sheet, expressed as per cent on basis weight in pounds. (25x40—500). The Elmendorf tear figures are the averages of 5 tears, also expressed in per cent on the same basis weight.

### 2. Bleach Consumption

The bleach consumption of the pulps manufactured was determined for single-stage bleaching, the test being carried out as follows:

The equivalent of five grams of air-dry pulp is well disintegrated and mixed with the volume of analyzed bleach liquor which will give the desired percentage of bleach on the pulp. Water is added to bring the ratio of air-dry pulp to liquid to 1:20, in other words, five grams of air-dry pulp in 100 grams of liquid. The mixture of pulp and bleach liquor is kept at 37-40 deg. C. with frequent shaking for four hours and then the excess bleach liquor is removed by suction filtering on a Büchner funnel. The excess bleach is back-titrated with 0.1 *N* arsenious oxide. The test is carried out in duplicate for each of the several five per cent intervals in the range of bleach consumption for which the pulp is tested.

The bleached pulp collected on the Buchner funnel is transferred to a 600 cc. Erlenmeyer flask, thoroughly shaken up in a small quantity of water and made into hand sheets on a brass wire mold. The sheets are then air-dried and tested for whiteness or color on the Ives Tint Photometer.

### 3. Color Value or Whiteness

The color value of the bleached an unbleached pulps was determined on a New Model Ives Tine Photometer.

### 4. Copper Number

This was determined by Forest Products Laboratory method No. 39.

### 5. Ash Determination

Three grams of oven dry pulp are incinerated in a shallow, tared, platinum dish in an electric muffle at a dull red heat. The determination was made by the Forest Products Laboratory method 66.

### 6. Alpha Cellulose

This was determined by the official TAPPI standard method for alpha cellulose in pulp, T203m (official standard Aug. 15, 1932).

### 7. Cuprammonium Viscosity

The method used for the determination of cuprammonium viscosity was essentially the "Tentative Official Standard Method of the Technical Association of the Pulp and Paper Industry" as described in *Paper Trade Journal*, 94, No. 19, pages 38-39 (May 12, 1932).

**Table 2—Pulp Characteristics**

| Sample No. | Yield in per cent | | Max. Strength* | | Bleach Req. per cent | Color (bv) | | Ash per cent | Lignin per cent | Alpha Cellulose | | Copper Nr. | Viscosity (centipoises) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Unscreened | Screened | Mullen | Tear | | Unbleach. | Bleached | | | Uncorrected | Corrected for Lignin | | |
| 1 | 45.3 | 42.2 | 135 | 292 | 9.6 | 15 | 82 | 0.66 | 0.46 | 86.1 | 85.7 | 1.93 | 62.9 |
| 2 | 41.4 | 40.6 | 92 | 232 | 1.2 | 56 | 91 | 0.61 | none | 82.0 | 82.0 | 2.03 | 14.1 |
| 3 | 33.1 | 32.8 | 52 | 122 | 1.4 | 66 | 97 | 0.79 | none | 69.7 | 69.7 | 3.17 | 6.2 |
| 4 | 39.6 | 39.4 | 78 | 179 | 1.5 | 63 | 92 | 0.59 | none | 78.9 | 78.9 | 2.32 | 9.4 |
| 5 | 43.3 | 42.7 | 111 | 221 | 3.3 | 49 | 88 | 0.55 | 0.26 | 82.7 | 82.4 | 1.84 | 15.3 |
| 6 | 48.1 | 39.3 | 133 | 215 | 14.6 | 15 | 76 | 0.72 | 1.95 | 87.3 | 85.3 | 2.53 | 49.9 |
| 7 | 43.3 | 37.2 | 92 | 195 | 4.6 | 43 | 86 | 0.61 | 0.63 | 87.3 | 86.6 | 1.29 | 34.2 |
| 8 | 44.3 | 42.7 | 100 | 285 | 3.8 | 61 | 96 | 0.68 | 0.04 | 86.8 | 86.8 | 0.78 | 26.5 |
| 9 | 45.2 | 44.7 | 113 | 315 | 2.6 | 48 | 87 | 0.59 | none | 88.1 | 88.1 | 0.62 | 64.2 |
| 10 | 44.5 | 43.7 | 115 | 306 | 2.5 | 43 | 96 | 0.63 | 0.04 | 88.0 | 88.0 | 0.80 | 40.6 |
| 11 | 38.4 | 37.2 | 94 | 264 | 3.4 | 63 | 96 | 0.56 | none | 82.0 | 82.0 | 1.08 | 18.9 |
| 12 | 42.8 | 40.6 | 113 | 176 | 0.4 | 74 | 90 | 0.58 | none | 82.2 | 82.2 | 2.17 | 15.4 |

*Points per 100 lb. ream.

**Non-Chlorine Pulps**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 13 | 50.9 | 49.9 approx. | 107 | 215 | 45.0+ | 21 | 38 | 0.84 | 12.98 | 91.8 | 78.5 | 2.56 | 25.9 |
| 14 | .... | 43.0 | 97 | 147 | 8.0 | 60 | 83 | 0.86 | 1.11 | 85.1 | 84.0 | 2.08 | 94.4 |

## DISCUSSION OF RESULTS

A higher yield of unscreened pulp is obtained from the gaseous chlorination treatments than from the corresponding chlorine hydrate treatments. The gaseous chlorine treatments give a lower yield of screened fiber for the single stage and two stage chlorinations. However, for all of the three stage treatments the gaseous chlorine treatments give a higher yield of screened pulp than do the chlorine hydrate treatments.

The high yield of unscreened stock from the single and two stage gaseous chlorinations is due to the relatively large quantity of unaffected shives. When these were removed by the screening operation a low yield of screened pulp resulted. The low yield of screened pulp from the three stage chlorine hydrate treatments may be due to the formation of hydrochloric acid in the third stage, which attacks the cellulose, since degradation is reflected in the strength and cuprammonium viscosity data of these pulps, which is lower than the corresponding three stage gaseous chlorine treatments.

The strength obtained from the single stage and two stage chlorinations is very nearly the same for both the gaseous chlorine and chlorine hydrate treatments. An interesting fact is to be noted in the case of the triple-stage chlorinations. Pulp prepared from a low initial stage chlorination gives a higher strength figure than does pulp prepared from the three-stage chlorination with a high percentage of chlorine in the first stage. As the amount of chlorine in the first stage is increased the strength figures both Mullen and tear decreases, even though the total amount of chlorine is kept constant. This variation in strength with the initial treatment holds for both the gaseous chlorine and chlorine hydrate prepared pulps.

The rate of hydration for the pulps is very rapid. The maximum Mullen test is obtained within a 20 minute ball mill operation, except in the case of pulp prepared in the single stage gaseous chlorination. This pulp approaches the soda-spruce and commercial unbleached sulphite pulps in its beating characteristics. Such pulps reach their maximum Mullen test after 60 minutes treatment in the ball mill.

The pulps prepared by the gaseous chlorine methods have a higher bleach consumption, and a darker unbleached and bleached color, except in one instance, than do the corresponding chlorine hydrate prepared pulps. The exception is in the case of the triple stage chlorine hydrate prepared pulp with the low chlorine first stage. This pulp has a higher bleach consumption and a darker bleached color than does its corresponding gaseous chlorine prepared pulp.

The ash content of the chlorine prepared pulps is lower than that of soda-spruce and sulphite-spruce pulps.

The lignin content is very low in all of the pulps. The highest percentage of lignin occurs in the single stage treatments. Pulps prepared by gaseous chlorine contain slightly more lignin than do the chlorine hydrate prepared pulps.

The alpha cellulose content of the pulps prepared in a single stage is very nearly the same. However, in the multi-stage treatments there is a lower alpha cellulose content in the "chlorine hydrate" pulps than in pulps prepared with the corresponding gaseous chlorine treatment. Practically the same variation is noted in the viscosity measurements—again emphasizing the high degree of cellulose degration which takes place in the high multi-stage chlorine hydrate chlorinations.

## CONCLUSIONS

1) It was possible to produce a satisfactory white pulp from spruce wood by a chlorination process.

2) The minimum alkali treatment that could be used to prepare spruce wood for defibering prior to chlorination on a laboratory scale was 10 per cent of sodium hydroxide.

3) It was impossible to obtain a good white pulp by either gaseous chlorine or chlorine water single stage chlorinations of the halfstock if only the minimum alkali pretreatment was employed.

4) Two-stage or triple-stage chlorinations with either gaseous chlorine or chlorine water produced a good white pulp from the minimum alkali halfstock.

5) The optimum consistency of halfstock for gaseous chlorine treatment was 25 per cent oven dry.

6) Gaseous chlorination gave a higher yield of pulp than did chlorine hydrate chlorination.

7) There was no pronounced difference in the strength characteristics of pulps prepared either by gaseous chlorine or chlorine hydrate for the one-stage and two-stage chlorination processes.

8) Three-stage chlorination with gaseous chlorine gave a much stronger pulp than did chlorine hydrate chlorination.

9) The bleach consumption of pulps prepared with chlorine hydrate is lower than the bleach consumption of similar pulps prepared with gaseous chlorine.

10) Cellulose degradation occurs to very nearly the same extent in the pulps prepared by the single stage chlorination with either gaseous chlorine or chlorine hydrate. Multi-stage chlorination with chlorine hydrate causes much more cellulose degradation than does the corresponding chlorine gas treatment.

# CARE OF FIRE HOSE

**MICHAEL BERMAN, Technical Superintendent, Hewitt Rubber Corporation**

▶▶▶ INDUSTRIAL PLANTS, as well as municipal fire departments, must, give their fire hose systematic care in order to get the most out of their purchases. These suggestions, should be of value to maintenance men employing this all-necessary item in or about their plants.

1) When new hose is received do not allow it to remain packed in cases until it may be required. Remove from cases and loosen the coils.

2) Do not allow hose to remain in trucks or on reels, if wet or muddy. Remove all mud by washing or brushing with a coarse broom and expose to air, in towers or on racks, preferably at full length, to dry.

3) Do not permit hose to remain on apparatus for any great length of time when not used. It should be removed, hung up in towers or on racks, and replaced with a fresh supply. Avoid short bends in hose that is stored away. When necessary to store hose in folds, the folds should be changed occasionally to overcome permanent set in the rubber lining.

4) Unless hose is likely to encounter a freezing temperature it is not necessary to drain the water out perfectly, as the rubber lining isn't injured by dampness within.

5) Hose when frozen is liable to crack, if bent while in that condition. Extreme cold causes deterioration of rubber, but not sufficient to prevent storage of hose in cold hose houses, if thoroughly drained and dried.

6) Avoid exposure of hose to very hot, dry air. It should not be stored where exposed to the sun's rays. When hose must be kept in hot, dry places it is best to pass water through it monthly.

7) When fire hose is being used, see that section nearest engine or hydrant is not being chafed at point of contact with the ground by vibration.

8) Acids and other chemicals, oils, iron rust, etc., fumes arising from some processes are injurious to hose and contact with them is to be avoided.

9) When discharging or recharging chemical engines or extinguishers, see that solutions used do not come in contact with the hose.

10) Before returning hose to apparatus or reel, see that the sections (or line of hose) are not twisted. Each section should be laid out straight and perfectly flat on the floor or ground and carefully examined. If twisted, irregularities in form of "lumpiness" will be observed or quickly detected when folding the hose on the apparatus or when applying it to the reel.

# Dryer Frame *of Welded Design*

**A. J. AUBIN and H. W. FRENCH**

▸▸▸ THE ADVANTAGES OF welded construction for paper machine dryer frames over cast iron "U" frames were revealed in a study of comparative costs of such frames on a 100-in. fourdrinier machine in current operation on high grade papers.

The machine which was studied has a total of 84 identical dryer frames—42 on each side. Each frame weighs 1132 pounds and costs approximately $150. The total amount of cast iron under consideration, therefore, is 95,088 pounds and is worth $12,600.

Each frame is 6 ft. 3 in. high and 4 ft. 8¾ in. wide, with webs ¾ in. and flanges ⅞ in. The critical section is 10 in. wide.

The strength of the present cast iron Section A was calculated by starting with the moment of inertia and values as follows:

| | | |
|---|---|---|
| Width of flange | b = | 6 in. |
| Width of web | d = | 10 in. |
| Thickness of web | t = | ¾ in. |
| Thickness of flange | = | ⅞ in. |
| Distance between flanges | h = | 8.25 in. |

The moment of inertia then becomes:

$$I = \frac{bd^3 - h^3\,(b\text{-}t)}{12}$$

$$= \frac{(6 \times 10^3) - 8.25^3\,(6 - \frac{3}{4})}{12}$$

$$= 254$$

The moment of inertia of steel is approximately 4/10 that of cast iron.

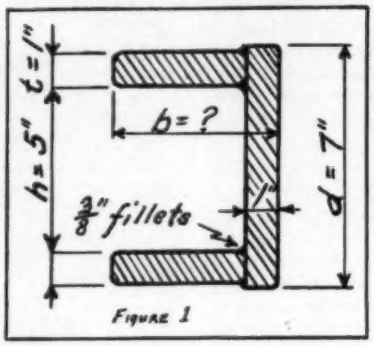



FIGURE 1

As a starting basis to design a new steel section, a rectangular solid steel section equal in depth to the present cast iron channel section was assumed.

Solving for the width *b*:

$$I = \frac{bd^3}{12} \text{ or}$$

$$102 = \frac{b \times 10^3}{12}$$

$$b = 1.224 \text{ in.}$$

Such a rectangular steel section, however, is not an economical use of metal. It is three times as strong as necessary because steel is three times as strong as cast iron. The most economical use of metal, therefore, will be obtained by providing all-welded steel construction of requisite strength.

The flanges of the all-welded design should be of sufficient width to accommodate the present dryer journal pedestals, and the combined web and flange section should be equivalent to the required value for the moment of inertia.

In the case of the present cast iron frames, the flanges must be at least 5 in. wide to support the journal pedestals. Hence, the new steel section must have flanges 5 in. or wider.

Again utilizing the formula

$$\left[I = \frac{bd^3 - h^3\,(b - t)}{12}\right],$$

and assuming that I = 102, d = 7 in., h = 5 in., and t = 1 in. (Figure 1), b is found equal to 5.004 in.

On this basis, a frame designated as Frame No. 3 in Figure 2 was conceived and a quotation was obtained from a local welding company for making it. A tabulation of the important information entering into the total cost of one frame follows:

| | |
|---|---|
| Cost of steel per pound | $.0371 |
| Amount of steel required including waste material | 967 lb. |
| Fillet weld | ⅜ in. |
| Yield point p.s.i. (stress relieved) | 50,000 lb. |
| Material cost $.0371 × 967 | $35.88 |
| Labor cost | $52.62 |
| Total cost of one frame | $88.50 |

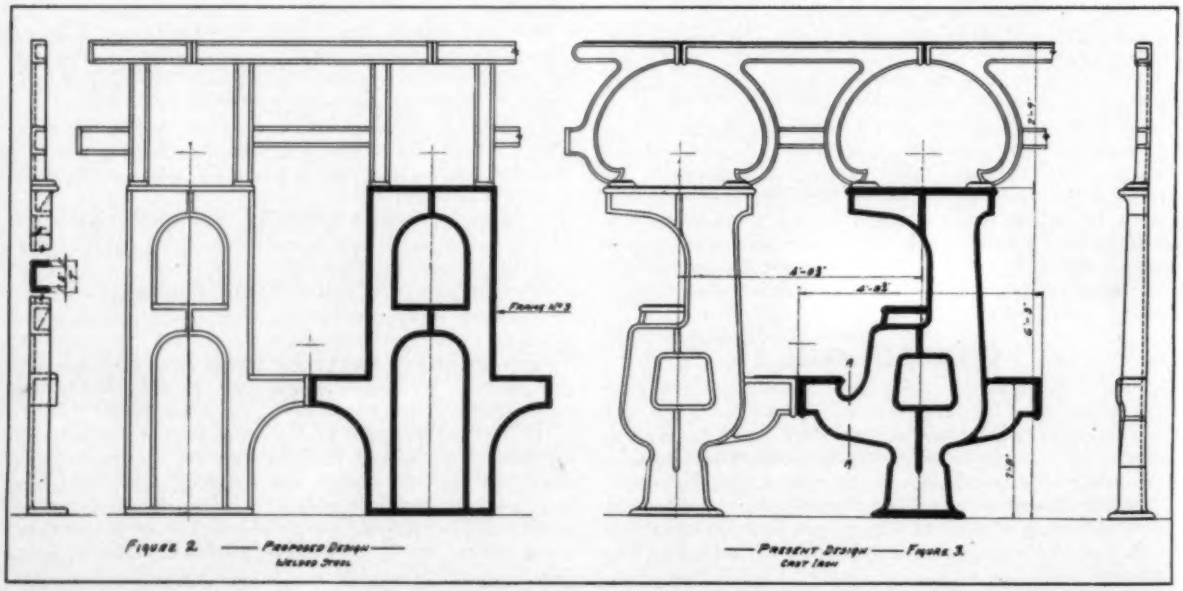


FIGURE 2. —— PROPOSED DESIGN —— WELDED STEEL

—— PRESENT DESIGN —— FIGURE 3. CAST IRON

On the paper machine under consideration, with frames of cast iron costing $150 a piece, there is a saving of $61.50 a frame in favor of the welded design. The minimum saving on the 88 frames, therefore, would total $5412.

Dryer frames of welded steel construction for the machine under consideration would have the following advantages over the present cast iron frames:

1) Greater strength and less weight.

2) More space around ends of dryers and easier access to felt rolls and journals.

3) Available for erection in less time than cast iron frames.

4) Approximately 41 per cent less in cost.

*The material in this article is based on a paper submitted by Mr. Aubin and Mr. French in The James F. Lincoln Arc Welding Foundation $200,000 Award Program, Cleveland, Ohio.—EDITOR'S NOTE.*

# A Practical ALUM TEST

**L. H. DONNALLY, Ph.D.**

▶▶▶ AMONG THE MOST IMPORTANT reasons for the use of aluminum sulphate in paper mills are: (1) To assist sizing and formation; (2) To neutralize carbonate; (3) To control pH.

In mills where there is a large amount of carbonate present, either from the use of shavings or from high carbonate water, or where sulphuric acid is used, the pH index fails to give even an approximate estimate of the aluminum sulphate concentration. When this condition prevails, practical difficulties often are encountered.

If the sizing goes "soft," there is no way of telling whether it is the alum concentration or that of the size which is low. If the alum concentration is deficient, sizing will not be benefited by increasing the size. Then, too, an excess of size may cause size spots and clog screens. Too high or too low alum concentration. On the other hand, will cause difficulty with formation. The quality of the sheet, therefore, is tied up directly with the aluminum sulphate concentration in the vat; and control of aluminum sulphate is necessary for uniform quality.

In addition to sizing and quality, there is the consideration of economical operation. Mill practice is to neutralize carbonates, either in whole or in part with aluminum sulphate. Obviously, this practice is wasteful; but it is necessary, because, without control of the aluminum sulphate, there is no way of knowing positively that enough is present. A large excess usually is used in order to be on the safe side. Also, as long as alum is added continuously to the system, and at least some of the white water is re-used, there is a continual "build up" of alum concentration. The maximum concentration, of course, will depend upon the relative amounts of fresh water and alum used in the system, and the time needed to reach maximum which is established by the capacity of the system of vats and connections. Obviously, there is a minimum efficient concentration; the excess is wasted.

There is no quick, easy and reliable control test for aluminum sulphate in general use in paper mills. However, there is a colorimetric test[1] which is ideally suited for paper mill control of alum concentration. The test is about as easy to run as a pH test and takes about as much time.

Although the test may be used for somewhat higher concentrations, its greatest usefulness is in the range of an $Al_2(SO_4)_3 18H_2O$ concentration of 0.01 per cent to 0.1 per cent. Concentrations in the beater, stuff boxes, chests, vats and of the white water usually are within this range.

## Necessary Equipment and Materials

Equipment, chemicals and reagents necessary for the test are as follows:

*Equipment*

1 spot plate

3 medicine droppers

*Chemicals*

95 per cent ethyl alcohol

hematein

sodium acetate

glacial acetic acid

Standard solution of papermakers alum or CP aluminum sulphate [Add 10 grams of dry papermarkers alum to 1 liter of distilled water. When dissolved, dilute 10 times to make a solution of 0.1 per cent papermakers alum $Al_2(SO_4)_3 18H_2O$. If it is desired to make comparison with other types of alum, a standard using CP aluminum sulphate may be made up and used where the standard solution is called for in the procedure which follows.]

*Reagents*

Universal extracting solution [Add 100 grams of sodium acetate ($NaC_2H_3O_2$ 3 $H_2O$) to 500 ml. of distilled water. After the sodium acetate has dissolved, add 30 ml. of glacial acetic acid and make up to 1 liter with water. This solution is approximately 0.2N in total acidity by titration and is buffered at 4.8 pH.]

Aluminum reagent — (Dissolve 0.05 gram of hematein in 100 ml. of 95 per cent ethyl alcohol. This solution should be prepared freshly at least once a month.)

## Procedure

Run blank test on either 0.1 per cent papermakers alum or CP aluminum sulphate solution, whichever is being used as the standard, as follows: Transfer two drops of the standard solution to spot plate, using one of the three medicine droppers. Next, add two drops of the Universal extracting solution, with another medicine dropper. Then, add one drop of aluminum reagent with the third dropper. A deep purplish coloration should result.

Compare this coloration with a solution made up by adding 100 ml. of mill water to 100 ml. of the standard solution, using the same procedure as for the first test. Continue dilution with mill water until no purplish coloration appears in one minute. This condition usually is reached when the standard alum solution has been diluted seven times.

Now run the same test using 100 ml. of white water, or any other solution containing alum in place of the standard solution. As dilution is made, the color on spot plate should change or become extinct just as it did when the standard solution was diluted and tested.

Suppose that the standard solution

[1]Adapted from a test for alumina given in "The Universal Soil Testing System" by M. F. Morgan (Connecticut Agricultural Experiment Station Bulletin 372). According to Dr. Morgan, iron is the only interfering constituent for the test and that only in abnormally large amounts.

reached a certain color or a given extinction at a dilution of seven times, and the white water reached the same color or degree of extinction at three times of dilution. At that point the concentration of each solution would be approximately 1/7 or 0.014 per cent of the standard. The concentration of the white water, therefore, when compared with the standard would be 0.014 × 3 or 0.04 per cent.

Hematein is a complex organic compound with a molecular weight of 300. It forms salts with heavy metals; and its coloration with aluminum may be due to salt formation. However, Dr. M. F. Morgan[2] states that hematein gives a purple color in the presence of soluble aluminum in a solution ranging from four to five pH, but that the coloration probably is not capable of expression in terms of definite chemical reactions. He also states that iron gives an indigo blue coloration with hematein, which although readily distinguished from the aluminum color, obscures the aluminum test. It should be emphasized that, in a given series of tests, the same medicine droppers should be used in the corresponding solutions, that is, a dropper should be reserved for the hematein solution, another for the Universal extracting solution, and a third for test solutions containing alum. In this way, the droppers become standardized with the test; and there should be no uncertainty about the size of the drops, if reasonable care is used to fill the droppers to the same level each time they are used.

In connection with the standard solution, it probably is best to use a standard that is fairly near to the concentration of the solution to be tested. A solution of paper makers alum with a concentration of 0.1 per cent was selected for the previous tests because white water had been found usually to be below that figure.

[2]Private communication.

# UNCLE SAM'S CENSUS MEN WILL VISIT PAPER MILLS

▶▶▶ THE UNITED STATES GOVERNMENT, on January 2, began the Sixteenth Decennial Census, one branch of which, the Census of Manufactures, is directly concerned with the pulp and paper industry. Four hundred American industries, including specifically the paper industry, will be tabulated in 1940 as America takes its ten-year inventory. This inventory, so far as industries are concerned, will cover activities during 1939. Some important features of the census have been forwarded by the Bureau of Census, and appear herewith.

While a few changes appear in the revised schedules of questions being used by the U. S. Bureau of the Census in enumerating the paper, pulp, and allied industries under the 1940 Census of Manufactures, such changes are mainly for administrative purposes and will not affect the work of the census takers in the field. Alterations by the Bureau in its classifications of paper activities, however, will assure easier interpretation of final reports on certain phases of the industry.

For instance, the classification followed in the 1937 Census of Manufactures has been revised to separate "Coated and Glazed Paper" figures from "Converted Paper Products Not Elsewhere Classified."

Another 1937 classification, really a catch-all, was titled "Boxes, Paper, Not Elsewhere Classified." It included boxes or containers of newsboard or cardboard, plain or metal edged to hold confectionery, millinery, cigarettes, druggists' preparations, etc. This has been slightly adjusted for the new Census and separate figures will now be available to cover "Fiber Cans and Tubes and Similar Products." The remaining items will be classed as "Paperboard Containers and Boxes Not Elsewhere Classified."

"Pulp Goods, Pressed and Molded" is an addition to the 1940 paper group. Formerly it was grouped under the Forest Products' grouping of "Synthetic Resin, Cellulose-Plastic, Vulcanized Fiber and Molded and Pressed Pulp Fabricated Articles."

The complete list of paper and allied classifications for the 1940 census follows:

Pulp mills; paper and paperboard mills; coated and glazed paper; envelopes; paper bag mills not operating paper machines; fiber cans, tubes and similar products; paperboard containers and boxes not elsewhere classified; die-cut paper and paperboard (cards, boards, milk-bottle caps, etc.); wallpaper; pulp goods, pressed and molded; converted paper products not elsewhere classified. The "die-cut" item for 1940 comprises the 1937 listings of "Carboard Not Made in Paper Mills" and "Card Cutting and Designing."

The paper executive's schedule includes queries on description of plant and legal form of operation; location; number of employees and officers classified according to type of work performed; wage earners employed by months, salaries and wages paid; cost of materials, supplies, containers for products, fuel, purchased electric energy, contract and commission work actually used or performed during 1939; type and horsepower rating, etc., of power equipment in plant (prime movers, generators, electric motors); fuel and electric energy used; expenditures for plant, equipment and real estate during the year; inventory at beginning and end of year.

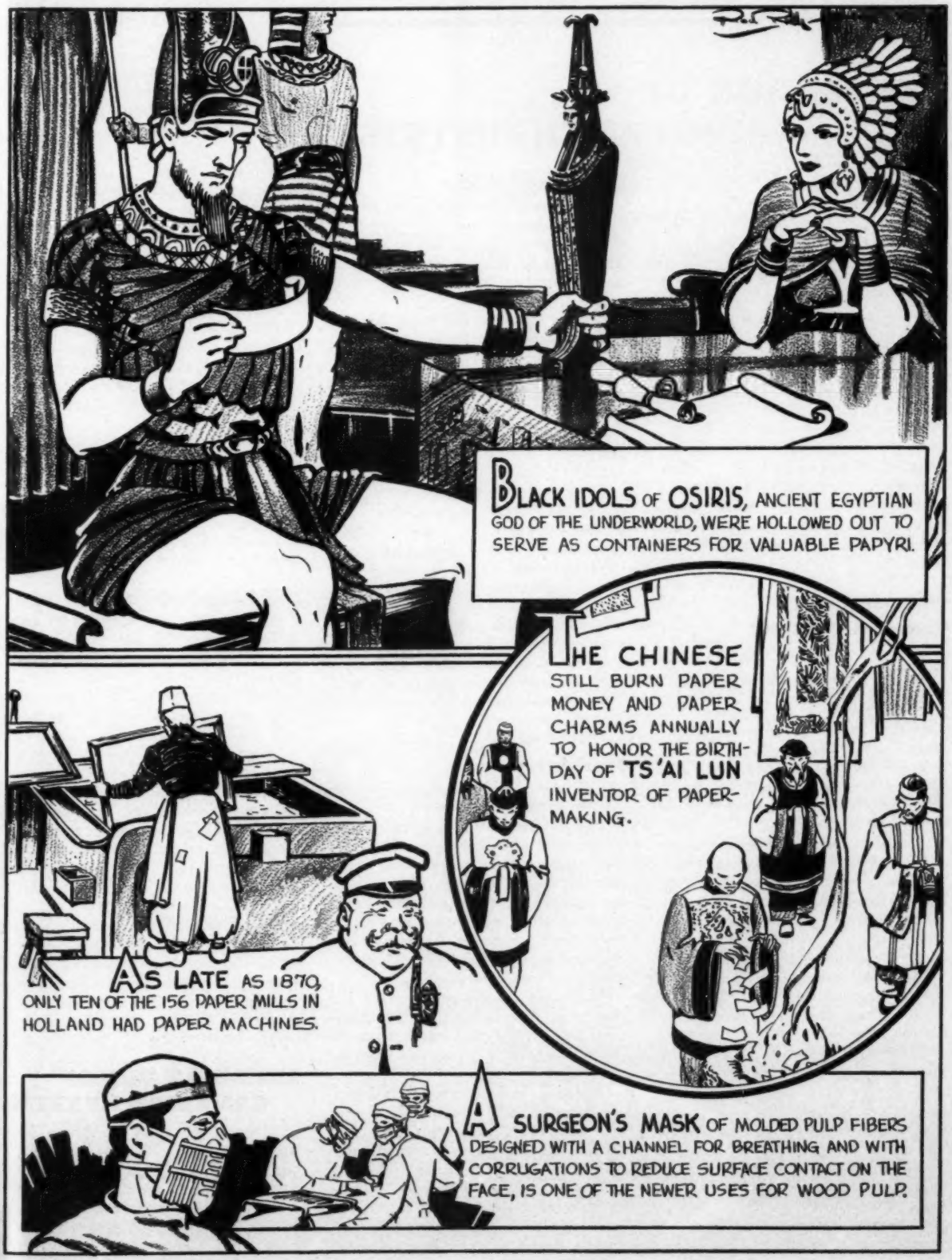
Details are also asked concerning type of products made and total work done during the year with specific breakdowns under newsprint groundwood printing, and specialty papers, book paper, writing paper, wrapping paper, tissue, absorbent building and other papers; boards, container boards; binder board, Bristol board, building boards, etc.

Paper manufacturers are also required to report converted products made in the same plant; chemicals produced; quantity and cost of chief materials used; man-hours expended, etc. Facts as to papermaking equipment in use or available for use on the last day covered by the report will also be required. In addition, each manufacturerey's schedule includes a sheet covering distribution of sales and interplant transfers of products.

The basic questions for pulp manufacturers or makers of converted products are generally similar to those for paper producers. Appropriate changes are made, of course, in the detailed queries concerning specific products. For the converter, for instance, space is given to allow inclusion of details on 40 different basic paper products, with separate breakdowns under some of these items and room for addition of "other products." Pulp mills are being asked for figures on cordage and costs of pulpwood consumed, by kinds of wood and process of manufacture.

The data collected will be used solely for preparing statistical information concerning the country's population, resources, and business activities. The census reports cannot be used for purposes of taxation, regulation, or investigation.

# PAPER SKETCHES


BLACK IDOLS OF OSIRIS, ANCIENT EGYPTIAN GOD OF THE UNDERWORLD, WERE HOLLOWED OUT TO SERVE AS CONTAINERS FOR VALUABLE PAPYRI.
THE CHINESE STILL BURN PAPER MONEY AND PAPER CHARMS ANNUALLY TO HONOR THE BIRTH-DAY OF TS'AI LUN INVENTOR OF PAPER-MAKING.
AS LATE AS 1870, ONLY TEN OF THE 156 PAPER MILLS IN HOLLAND HAD PAPER MACHINES.
A SURGEON'S MASK OF MOLDED PULP FIBERS DESIGNED WITH A CHANNEL FOR BREATHING AND WITH CORRUGATIONS TO REDUCE SURFACE CONTACT ON THE FACE, IS ONE OF THE NEWER USES FOR WOOD PULP.

# ALLIED

## EXPOSITION OF CHEMICAL INDUSTRIES

▸▸▸ SETTING NEW STANDARDS in scope and value, the Seventeenth Exposition of Chemical Industries, held at the Grand Central Palace in New York City, December 4-9, attracted more than 40,000 visitors who visited three full floors of exhibits.

Expert use of color and form in the design of exhibit booths was prevalent. An interesting feature of display construction was the functional manner in which many exhibit backgrounds had been put to use to display the product. The keynote of the show was the exhibit of the American Chemical Society, which emphasized the research achievements in the fields of pulp and paper, foods, chemicals, resins, petroleum, chemical engineering, chemicals, rubber, paints, equipment, and varnishes.

### Chemicals and Chemical Products

Hundreds of new products were presented this year and there were many representatives in the organic field, including the nitro-paraffins and their derivatives. These new synthetic organic chemical compounds derived from petroleum hydrocarbons give promise of attaining an importance comparable to that of the coal tar derivatives, it is said.

Another interesting exhibit was devoted to glycerine and showed how it was used in the manufacture of foods, cosmetics, pharmaceuticals, textiles, rubber, leather goods and plastics. The same display showed sources of fats and oils used in soap manufacture.

Insulating materials exhibited included asbestos, magnesia, rock cork, silicious brick, and fibrous glass. Diatomaceous products—filtering elements—were also on display as fillers and extenders in the manufacture of paper, rubber, plastics, oil and water paints and varnishes. Refractories of many kinds were on display, including block and tile forms, cements, and the tools for applying them.

Surface coatings on display included paints, varnishes, lacquers, enamels, and special water proofing and corrosion-resistant treatments.

### Metals and Alloys

A comprehensive exhibit of steels and corrosion resistant alloys in addition to non-ferrous metals illustrated their use in chemical engineering plant construction and equipment application.

Of particular interest were the exhibits of welding equipment and methods. One company showed a shot weld machine in operation and accompanied it with a graphic explanation of how it worked. One exhibitor featured presented welded stainless steel fabrication and a moving display of stainless and non-ferrous arc welding samples.

Other items in the metals section included special tubing for a variety of process applications, special steel tanks, woven wire fabrics, wire rope, cable and cloth. Couplings and valves of all sizes in brass, aluminum, alloys, steel and nickel, were shown for services involving a complete range of pressure and temperature conditions.

Platinum and palladium were featured in terms of their use as catalysts, as spinnerets for rayon and as electrical contacts.

### Machinery

The latest machinery and equipment for all of the unit processes of chemical engineering were featured at the Exposition. These processes included industrial stoichiometry, flow of fluids, flow of heat, handling of fuels, and production of power; combustion; crushing and grinding, mechanical separation; filtration, vaporization, evaporation, humidification, dehumidification, drying, and distilling.

Machinery for the papermaking industry was offered by nine exhibitors and drying equipment and machinery was featured by some twenty-two firms.

Included in the various exhibits were crushing and grinding machinery, ball and pebble mills, separators, electrostatic equipment, pulverizers, mixers, roller mills, thickeners, dehydrators, and centrifuge equipment.

Much attention was paid to exhibits of equipment designed to separate solids from liquids. Drying equipment also received a good amount of attention.

### Pumps

Thirty-three exhibitors showed pumps of all kinds for all kinds of services, including a motor-driven, high pressure, reciprocating pump and a controllable-capacity, vertical, triplex, reciprocating-plunger pump. The range of pumps on exhibition included units suitable for handling rarefied gases to steam-jacketed pumps suitable for moving the most viscous materials. Motor-driven, high pressure reciprocating chemical pumps featured integral, ball-checked valves for both suction and discharge.

### Materials Handling

Materials handling equipment included hydraulic lifts, stackers, racks, skids, and conveyors of various kinds. The equipment was adapted for handling barrels, bales, drums, carboys, cylinders and heavy rolls of paper.

### Containers and Packaging

Containers on display included bags, bottles, jars, boxes, cans, kegs, barrels and drums. Equipment for filling, bottling, capping and labeling as well as carton filling and sealing was shown.

### Precision Instruments

Instruments of precision exhibits showed automatic control devices, multiple recording potentiometers, and electric flow meter transmitters, in addition to industrial thermometers, pH controls, oil testing instruments, and automatic water stills.

In addition to the many features at the Exposition, there were also extensive exhibits of factory equipment such as safety devices, fire extinguishers, etc., and a very interesting exhibit of automatic molding machines. Electric motors, including dust-proof and explosion-proof types, were prominently displayed.

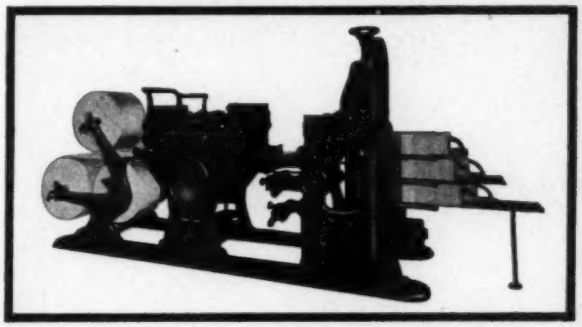
The Seventeenth Exposition of Chemical Industries was under the personal direction of Charles F. Roth, who has managed each of these presentations since the first one was organized in 1915.

◆

## LINK-BELT BUILDS CANADIAN BRANCH

A new office and warehouse has been erected by the Link-Belt Company in northern Canada at Swastika, Ontario, where stocks of the commonly used elevating, conveying and power transmitting machinery will be maintained. The location of the new

## HIGH SPEED



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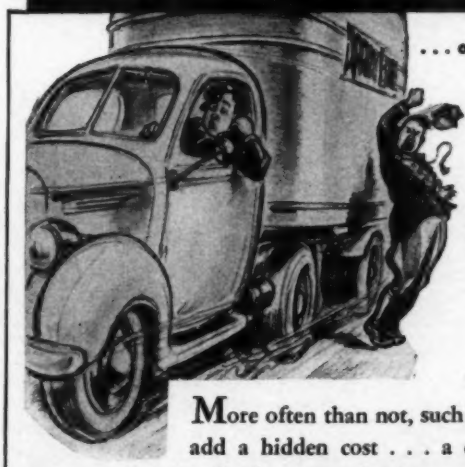
## HIT OR MISS METHODS



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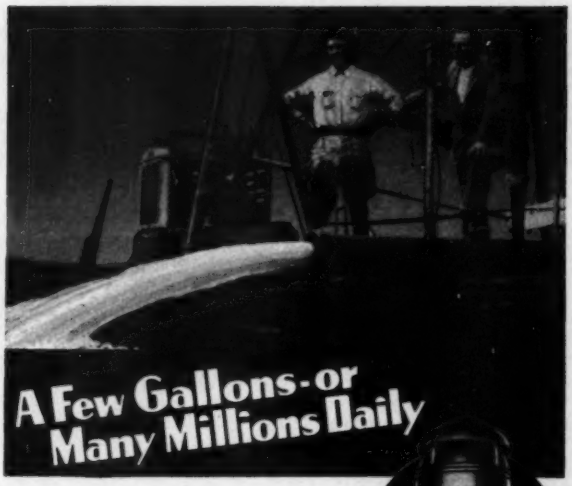
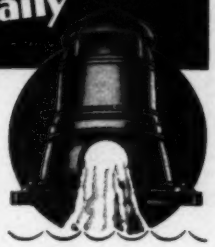


## A Few Gallons-or Many Millions Daily



Every factory and municipality needs an adequate supply of water. Whether requirements are for a few hundred gallons, or many millions daily, serious technical points will be encountered. They must be met with knowledge and skill.

For example: What are the geological and hydrological conditions? Where is the replenishing area of the water? What will be the effect of water level and pressure after steady pumping for a year or more? What hydraulic gradient will be required in each individual well? What hydraulic gradient will be required into the area for the total supply? In order to prove permanent and most efficient, what construction should be used in the well? What should be the location of the wells?

Many factories and municipalities overlook the importance of the points outlined above. Layne engineers, geologists and hydrologists are specialists in ground water problems. Save wasteful expenditures by calling them in. For bulletins, address

LAYNE & BOWLER, INC.
Dept. P, Memphis, Tenn.

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LAYNE-ATLANTIC CO. . . . NORFOLK, VA.
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LAYNE-NORTHERN CO., MISHAWAKA, IND.
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LAYNE-NEW YORK CO. . NEW YORK CITY, AND PITTSBURGH . . . . . PA.
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# LAYNE

## PUMPS & WELL WATER SYSTEMS

*For Municipalities, Industries, Railroads, Mines and Irrigation*

branch was chosen because of its advantageous nearness to many pulp and paper mills in northern Ontario and Quebec.

The new branch will be in charge of George Kaiser, who has been employed at Link-Belt's Toronto branch for the past ten years.

◆

## GEN. CHEMICAL BUILDS NEW MENASHA BRANCH

The foundation for the new building of the General Chemical Company, being constructed in Menasha, Wisconsin, was completed the last week of December. The $12,000 building will contain office space and a factory room and is similar to one being built at Wisconsin Rapids by the same company.

When completed the chemical company will have branches located in the two paper centers in this area to supply aluminum sulphate for the various paper concerns located therein. It is expected that the material will be distributed by tank truck.

The one-story building is to be 100 feet long and 50 feet wide and will be of steel construction. A metal tank, of tank car capacity, has already been placed on a foundation inside the projected building.

◆

▸▸▸ ORDERS FOR ABOUT 150,000 feet of firehose for two of the largest building projects in the country have been placed with the United States Rubber Company.

◆

## PERKIN MEDAL TO DU PONT'S DR. STINE

The Perkin Medal, awarded each year for valuable work in applied chemistry, was presented this year to Dr. Charles M. A. Stine, director of research and vice president of E. I. du Pont de Nemours and Company, at a joint meeting of the Society of Chemical Industry, the American Chemical Society, the American Institute of Chemical Engineers, the Electrochemical Society and the Societe de Chimie Industrielle, on January 12.

Dr. Wallace P. Cohoe, chairman of the American section, presided over the meeting. Dr. Cohoe began the program by a commemorative address regarding former medallists which was followed by a talk on the life and the accomplishments of the medallist by Dr. Harrison E. Howe, editor of *Industrial and Engineering Chemistry*. After the presentation of the medal by Professor Marston T. Bogert, senior past president of the society, Dr. Stine gave the medal address which was entitled "The Rise of the Organic Chemical Industry in the United States." A dinner in honor of Dr. Stine preceded the meeting which was held at the Chemists' Club in New York City.

◆

## NEW ADHESIVE

Vulcalock cements, described by the manufacturer as one of the most remarkable adhesives ever developed, are now released for sale on a restricted basis, it is announced by the B. F. Goodrich Company, Akron, Ohio. The cements were sold previously under license agreements.

According to the announcement, Vulcalock cements have enabled users to accomplish assemblies previously considered impossible, particularly in making strong, waterproof, chemically-resistant joints between rubber and metals. They also have unique properties in joining a wide variety of other materials, including many synthetic resins, woods and ceramics, it is said. The cements resist cracking by bending, shock, or variations in temperature, and have chemical resistance better than rubber itself.

**GET THESE ADVANTAGES WITH CLEVELAND TRAMRAIL**

In paper mills and manufacturing plants throughout the country Cleveland Tramrail paper-handling systems are being used because they —

1. Greatly increase storage capacity
   — by piling rolls higher.
   — by eliminating need of aisle space.
2. Avoid rehandling.
3. Eliminate damaged stock losses.
4. Cut handling time.

Whether you require a simple hand-operated hoist and carrier or a complete plant-wide electrified system with motor-operated grabs, Cleveland Tramrail is ready to serve you.

Sales offices in 60 principal cities in United States and Canada.

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THE CLEVELAND CRANE & ENGINEERING CO.
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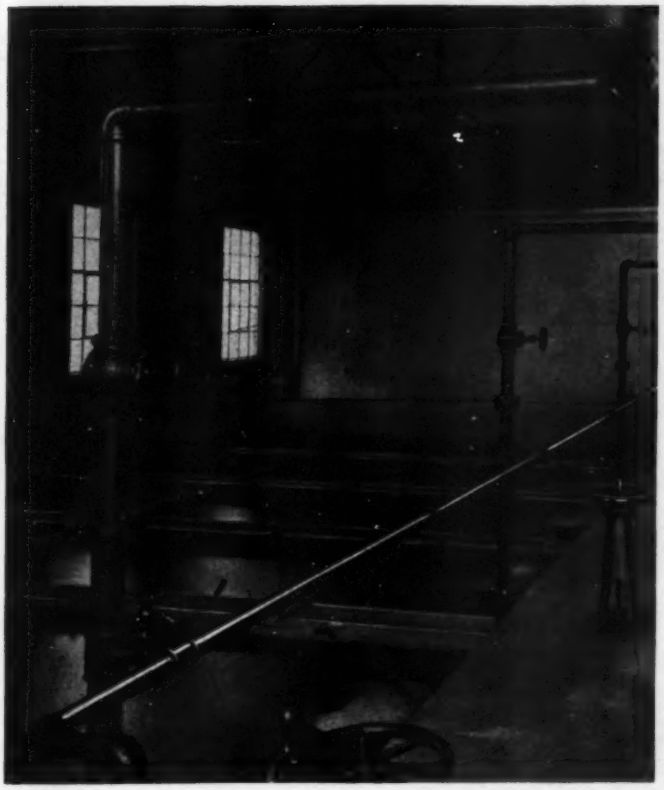
CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT
Other products: CLEVELAND CRANES and STEELWELD MACHINERY



# There Are Many Ways to Improve Your Water With Norwood Filters

There are many ways to improve your process water and thus improve your sheet by eliminating spots and specks which come from muddy or polluted water.

Check your filters today . . . perhaps new sand and gravel is needed; possibly the installation of chemical feeders will eliminate the trouble; or maybe the replacement of worn out strainers will solve the problem . . . whatever the trouble, the easiest, quickest way to solve your water problems is to call on Norwood's 44 years of experience to help you.

***Discuss your problems with Norwood's Engineers. Write Today.***

**THE NORWOOD ENGINEERING CO.**
**16 No. Maple St., Florence, Mass.**

**A GOOD START AND A GOOD FINISH WITH**
**NORWOOD**
**DEPENDABLE WATER FILTERS AND PAPER FINISHING MACHINERY**

---

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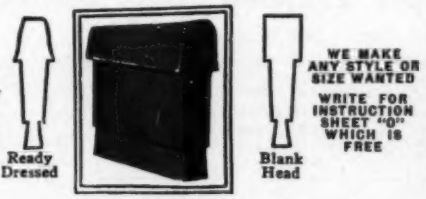
***LABOR SAVING—TIME SAVING***

THE MOST ECONOMICAL FILLING THAT CAN BE PUT IN A MORTISE WHEEL

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**QUICK SERVICE ON ALL SIZES**

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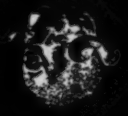
THE TRADE-MARK OF GOOD FELTS



The Waterbury Felt Co.
SKANEATELES FALLS, N. Y.

---

**ENGLISH** ECCO CLAYS TRADE MARK **CLAYS**

**UNIFORM • SUPERIOR • DEPENDABLE**

**English China Clays Sales Corporation**
**551 Fifth Avenue, New York City**

# SAFETY

## INTRODUCING "SLOPPY SAM"

"Sloppy Sam," the brain child of the Plant Inspection Committee of Joseph T. Ryerson, Inc., in Buffalo, New York, has proven valuable as a solution to the problem of promoting safety and efficiency through plant cleanliness.

"Sloppy Sam," who, as the accompanying photograph shows, is no acme of sartorial perfection, is given lodging in departments proclaimed substandard by the Committee during the weekly inspection tours. His visits evoke good natured chiding from members of other departments who, in turn, make a definite effort to keep their departments clean so that the unwelcome visitor will have no reason to call on them. The results of this humorous approach to the cleanliness problem were so favorable that duplicates of Sam were made for the company's other plants. The figures are flame-cut by Ryerson from rolled steel plate and are painted in bizarre colors.

Sloppy Sam

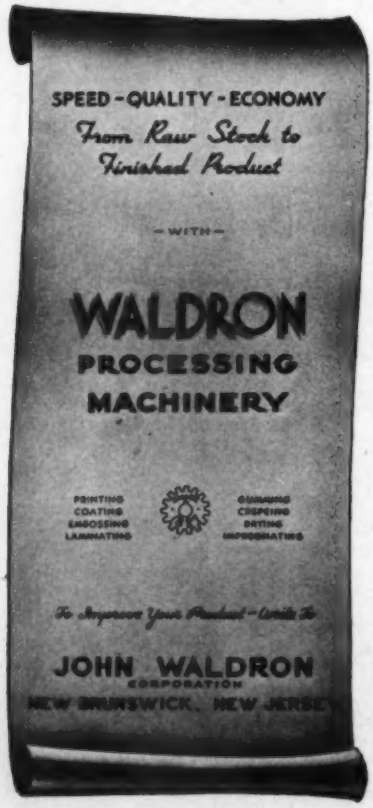
Needless to say, inasmuch as cleanliness is a definite contribution to safety and efficiency in any industry, Ryerson's sugar-coated approach to this problem can undoubtedly be used to advantage by operating departments in almost every factory or plant.

◆

▶▶▶ THE FIRST ACCIDENT ever to occur at the Mersey Paper Company, Liverpool, Nova Scotia, took place recently. The plant had had a completely clean record on mishaps which had prevailed for the approximate ten years that the plant has been in operation. The Mersey Paper Company had been remarkably successful in a drive to keep lost time accidents out of their mill, one of the busiest in the country.

◆

▶▶▶ A BRONZE PLAQUE was presented to the Piermont paperboard mill of the Robert Gair Company, Inc., on December 9 for its record of 500,000 man-hours without a lost-time accident. The plaque, presented by Norman F. Greenway, vice president and general manager of the Gair organization, was accepted by Dennis Hogan, superintendent of the mill on behalf of the mill employees.



## The Paper Industry Safety Contest

**July 1, 1939 to June 30, 1940**

**Out of 181 mills reporting for November, 25 have perfect record**

**PERFECT SCORES**

**Division I—Pulp and Paper Mills**

| PARTICIPANT | MILL | LOCATION |
|---|---|---|
| **GROUP A** | | |
| Price Brothers & Co., Ltd. | Kenogami, P. Q. | Canada |
| The Gardner-Richardson Co. | Lockland | Ohio |
| **GROUP B** | | |
| **GROUP C** | | |
| Southern Kraft Corporation | Continental Div. | York Haven, Pa. |
| Escanaba Paper Company | Escanaba | Michigan |
| Central Fibre Products Co. | Quincy | Illinois |
| *The Eddy Paper Corp. | White Pigeon | Michigan |
| *Strathmore Paper Co. | Woronoco | Massachusetts |
| American Writing Paper Corp. | Linden Div. | Holyoke, Mass. |
| The Mead Corporation | Sylva Paperboard Co. | Sylva, N. C. |
| **GROUP D** | | |
| Bird & Son, Inc. | Phillipsdale | Rhode Island |
| Crown Zellerbach Corporation | Crown Willamette Paper Co. Div. | Lebanon, Ore. |
| American Asphalt Roof Corp. | East St. Louis | Illinois |
| American Writing Paper Corp. | Nonotuck Div. | Holyoke, Mass. |
| Spaulding Fibre Co., Inc. | Milton | New Hampshire |
| United States Gypsum Company | North Kansas City | Missouri |
| The Mead Corporation | Nashville | Tennessee |
| International Paper Co. | Livermore No. 11 | Livermore Falls, Me. |
| Hollingsworth & Whitney Co. | Aroostook & Cobbossee Mills | Gardiner, Me. |
| Hollingsworth & Whitney Co. | Abenaquis Mill | Madison, Me. |
| International Paper Co. | Riley No. 23 | Riley, Me. |
| Spaulding Fibre Co., Inc. | Hayes | New Hampshire |

**Division II—Paper and Board Re-Manufacturing**

| | | |
|---|---|---|
| *Gaylord Container Corp. | St. Louis | Missouri |
| Kimberly-Clark Corp. | Atlas Mill | Appleton, Wis. |
| Bird & Son, Inc. | Shreveport | Louisiana |
| Day West Paper Co. | Green Bay | Wisconsin |

*November report missing—covers four months only.

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DARNELL
Nearly 4,000 TYPES of CASTERS and WHEELS by DARNELL
For Savings, Service, Safety and Speed—Demand Darnell Dependability. A caster or wheel for every industrial use.
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1—625 KVA Allis Chalmers low pressure turbo generator set, 3 phase, 60 cycle, 480/240 volts, 3600 RPM, 16 lbs. abs. or 150 lb. gauge pressure, condensing.
1—750 KVA Cr. Wheeler 3 phase 60 cycle 480/240 volt 600 RPM alternator.
3—300 KVA G. E. 3 phase 60 cycle 480/240 volt 600 and 720 RPM alternators.
9—25 KW to 600 KW 250 volt and 125 volt DC synchronous motor generator sets.
1—500 KVA Westinghouse Synchronous Frequency Changer, 3 phase, 25/60 or 60/25 cycles, 240/480/550/2300 volts, 750 RPM.
2—300 HP West. New 3 phase, 60 cycle, 440/220 volt 300 RPM slip ring motors.
1—300 HP Wgse. 230 volt, DC 3 br., 625 RPM motor.

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**VEST POCKET POWER PLANTS**

Small space occupied, any capacity, low over-all operating costs, high and extreme efficiencies, reliability, low initial investment.
Complete power plants to meet any operating conditions of Pulp and Paper mills or other Industrial service. Engineering and Construction.
Satisfactory Services Always Guaranteed.

**FERGUSON ENGINEERS**

Power Specialists
Monadnock Bldg., Chicago

**RYERSON CERTIFIED STEELS**

**IN STOCK . . . IMMEDIATE SHIPMENT**

When you need steel of any kind, a single bar or a carload, order from the nearest Ryerson plant. Write for Stock List.

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|---|---|---|---|
| Bars, Shapes | Shafting | Rivets, Bolts | Alloy Steel |
| Structurals | Tubing | Welding Rods | Tool Steel |
| Rails, Plates | Boiler Fittings | Stainless Steel | Floor Plates |
| Sheets—Strip | Reinforcing | Babbit, Solder | Safety Tread |

Ryertex water-lubricated Bearings give cleaner, more uniform products . . . reduced power consumption . . . longer bearing life . . . and eliminate lubrication. These are some advantages of Ryertex installations on Jordans, Beaters, Press and Couch Rolls, grinders, Calendars, etc. Write for complete information.

Joseph T. Ryerson & Son, Inc., Chicago, Milwaukee, St. Louis, Detroit, Cincinnati, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

*"Believe It or Not!"*

**Accidents steal over $1,000,000.00 annually from the paper and pulp industry!**

The above almost amazing but quite conservative figure is based on compensation costs alone! All cases and costs included, the total figure is four or five times the cost of compensation. In other words the average total cost of accidents in the paper and pulp industry is about $60.00 per worker per year—equal to the average production cost per ton of paper.

What can be done about it? The National Safety Council has published an interesting little booklet which gives the answer—briefly and concisely. We'll gladly send a copy FREE to any safety director or plant executive on request. Just drop us a line on company letterhead.

PAPER & PULP SECTION

NATIONAL SAFETY COUNCIL
20 NORTH WACKER DRIVE, CHICAGO, ILL.

# OTHER COUNTRIES

## ITALIAN NEWS

### Cellophane Industry

The Italian Cellophane industry was initiated in 1931 and at present produces not only enough of this product to cover national needs but also considerable quantity for export, according to an Italian correspondent. During the first six months of 1939, it is reported, Italian exports of Cellophane and allied products reached a value of some 2,194,000 lire. Cellophane has found wide usage in Italy in various fields and its industrial applications are increasing rapidly.

### Cellulose

According to reports from Italy, research conducted with corn stalks has resulted in a production of richer cellulose which is suitable for the paper and rayon viscose industries. The preparation of cellulose, through the Contardi process, consists essentially of two boilings, an acid and alkaline, with an intermediate washing, followed by bleaching operations. This process yielded 92 to 93 per cent alfa cellulose, 0.26 to 0.28 per cent of ash and, 1 to 1½ per cent of copper number for every 100 parts of dry cellulose.

◆

## INDIA HAS THREE MILLS UNDER WAY

There are three mills in India which are either under construction or projected and which can be expected to start operations within a year or two. In the fourteen paper mills now under operation there are altogether twenty-seven paper-making machines with a combined yearly capacity of 90,650 tons (British tons of 2,240 pounds) of paper a year. The most important of these mills are the two owned by the Titaghur Paper Mills Company, Ltd.

Most of the pulp used by the paper mills in India is manufactured by the different mills from materials which are obtained primarily from local sources. The two most important materials are bamboo and sabai grass. The manufacture of wood pulp from coniferous woods has never been developed in India for the reason that only a limited supply of such woods is available and, moreover, are difficult of access. The Indian paper mills are entirely dependent on foreign countries for their supplies of wood pulp.

◆

## DATES SET FOR LEIPZIG FAIR

The Leipzig Trade Fair will be held from March 3 to March 10, 1940, it has been announced recently. The spring fair will be the 1,983rd session of the historic exchange which has been held in the German city for 700 years.

It has been stated that more than a score of countries will send their newest art and industrial products. The technical division will, as usual, be the great clearing house for every form of machinery and will include the newest types of agricultural equipment. A new building has been added to the forty-two great structures already in use.

◆

▸▸▸ ENGLISH MILLS MAY ATTEMPT to manufacture paper from bracken, it was indicated in a news item in the *World's Paper Trade Review*. It was stated that one English firm made about 250 tons of paper from this raw material during the last war. The process of obtaining cellulose from the bracken is exactly that as used in the treatment of esparto grass.

◆

## NETHERLANDS INDIES NEEDS NEWSPRINT

There is a need for newsprint in the Netherlands Indies at present, it is reported. Imports of plain and colored newsprint into this country have averaged about 6,000 metric tons (metric ton equals 2,204.6 pounds) yearly during the period 1932-1937 inclusive. As there has been a further increase in the number of newspapers, periodicals, etc., published since the close of 1937, it is said that the consumption at the present time averages more than 500 tons per month.

Dark green slime spot in 30-lb. green bond paper. Enlarged 30 times. Courtesy Messrs. Murray M. Rubin and Milton L. Rubin.

Slime—anywhere in the system is bound to affect quality—to boost "second grade" (or worse) production.

You can rarely eliminate the sources of slime in your water supply but you CAN control slime in your system.

MAGNUS SLIME REMOVER

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Write today for your copy of the Paper Mill Cleaning Handbook.

cleans sand filters, beaters, machines and every other location where slime can accumulate. It kills the bacteria and fungus growths that are the base for slime. It penetrates and loosens all deposits, making them non-adhesive. It converts all slime constituents to a stable, finely divided emulsion which rinses off QUICKLY and COMPLETELY.

End the slime and "seconds" partnership and save needless production expenses and delays.

MAGNUS CHEMICAL COMPANY

Manufacturers of Cleaning Materials, Industrial Soaps, Metallic Soaps, Sulfonated Oils, Emulsifying Agents and Metal Working Lubricants.

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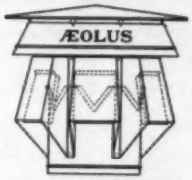
MAGNUS CLEANERS

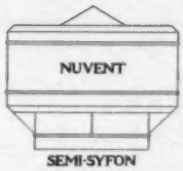
# VENTILATORS — All Types Improved

With Speed Vanes

Injector Type



Improved Syfon Type



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All Sizes

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## FLEXIBLE COUPLINGS

All Metal Forged Steel No Welded Parts

Oil Tight Free End Float Dust Proof Fully Lubricated

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EASTON, PENNSYLVANIA, U.S.A. PAPER MAKERS IMPORTING CO., INC. PMI INC

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## PRECIPITATED CALCIUM CARBONATE

# PERSONALS

## WHEELWRIGHT NOW PRIVATE CONSULTANT

William Bond Wheelwright, widely-known authority on the development and use of printing papers, is now located in Cambridge, Massachusetts, where he has established himself as counsellor on advertising and sales promotion. Mr. Wheelwright recently discontinued the publication of *Paper and Printing Digest,* which was issued monthly from Chicago. In addition to his sales promotion and advertising work, Mr. Wheelwright will also accept special writing assignments such as he has done previously, including supervision of layout and printing.

◆

▸▸▸ *E. Haegler,* Brazilian representative for Rayonier, Inc., has returned to Rio De Janeiro after a two-month visit in the United States, part of which time he spent at the Rayonier mills in Washington. Mr. Haegler made both trips by plane, covering some 30,000 miles.

◆

## E. W. TINKER IS SECRETARY OF A.P.P.A.

E. W. Tinker, well known throughout the paper and pulp field by virtue of his activities as assistant chief forester of the United States Forest Service, is now secretary of the American Paper and Pulp Association. Mr. Tinker has succeeded Charles W. Boyce who resigned recently to enter private business.

Mr. Tinker has had extensive experience in the Forest Service having entered that organization in 1913. When, in 1929, a new forest regional organization was set up in the Lake States Mr. Tinker was appointed regional forester and was given complete charge of the administrative activities. He was made assistant chief forester in 1936 and handled the development of co-operation with state and private agencies. It was in the development of this work that Mr. Tinker became more widely acquainted with activities in the paper and pulp industry. He is also credited with organizing the New England Timber Salvage Administration to assist the New England states in fire control and timber salvage following the hurricane in 1938.

◆

## KEEFER LEAVES N.S.C.—FORNEY SUCCEEDS HIM

W. Dean Keefer, one of the nation's authorities in the field of industrial safety engineering, ended twenty-one years with the National Safety Council recently to join the Lumbermens Mutual Casualty Company as assistant to the vice president in charge of safety engineering.

Mr. Keefer joined the Council as a safety engineer, later served two and one-half years as business manager and for the last sixteen years has been chief engineer and a director of the Council's Industrial Division.

Succeeding Mr. Keefer as director of the Industrial Division is R. L. Forney, assistant to the managing director, who will retain this latter responsibility in addition to his new duties. Mr. Forney has directed the Council's Statistical Division for the past twelve years. In this period he brought the division to nationally recognized leadership on accident facts and figures in every field of safety. He directed and edited the annual publication of *Accident Facts,* a statistical yearbook which is used and quoted generally as an authoritative reference volume on accident totals, causes and costs.

**W. Dean Keefer (left), who has left the National Safety Council after serving as head of the Industrial Division for twenty-one years. R. L. Forney (right) has been chosen to succeed Mr. Keefer.**

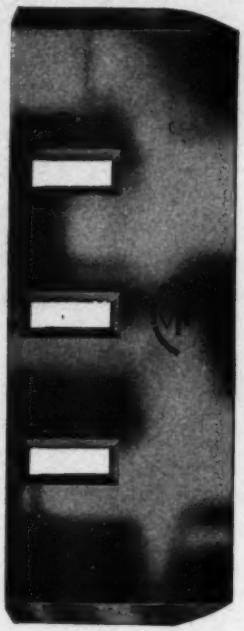
**Louis H. Brendel**

▸▸▸ Formerly assistant sales manager of the Hancock Valve Division, *Louis H. Brendel* has recently been appointed assistant to C. H. Butterfield, general sales manager of Manning, Maxwell and Moore, Inc., of Bridgeport, Connecticut, makers of safety vales, thermometers, globe valves, etc. Mr. Brendel's new duties will include the supervision of sales promotion and jobber relations for the Ashcroft Gauge Division, the Consolidated Safety Valve Division, the American Schaeffer & Budenberg Instrument Division, and the Hancock Valve Division.

◆

## M. J. MORIARTY SIXTY-FOUR YEARS A PAPERMAKER

Maurice J. Moriarty, president of the Morart Paper Company of Holyoke, Massachusetts, observed his sev-



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UNIFORM CHIPS
with these

# CHIPPER KNIVES

(Made with one or more slots)

Made a superior, tough, edge-holding quality. Write for prices on these Knives or on Paper Cutter Knives, Band Saws or Circular Saws.

## SIMONDS SAW AND STEEL CO.

FITCHBURG, MASS.

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## BAUER EXPERIMENTAL TESTING PLANT

The one place in the supply branch of your industry where you can experiment with your various grades and scientifically change their characteristics to meet certain needs. . . . Complete mill equipment, including preparation units—Oliver, Downingtown wet end, dryer, etc. . . . Tests made on a per day cost basis, and nearly 500 mill tests already on record.

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# why WRIGHT *Improved High Speed* HOISTS are RIGHT for your jobs . . .

● They're right because Wright Hoists in their various sizes are built to take actual operating conditions just as they come.

Hoists in real industrial work encounter the real industrial atmospheres that bring most products to time. They meet dampness, dust and grit, heat and cold, corrosive substances in the forms of gases, solids and liquids.

Wright meets them. It is prepared: first, by a full zinc coating of all parts: second, by a perfect sealing and lubrication; third, by an internal design that combines well engineered provisions for efficiency with the best of adaptation to actual operating requirements.

The Wright Hoist has 21 real points of superiority. Some of these are most valuable on some jobs. All are valuable on all jobs. The Wright Catalog tells the story. Send for it.

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**WRIGHT MANUFACTURING DIVISION**

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Trade Mark

## AMERICAN CHAIN & CABLE COMPANY, Inc.

*In Business for Your Safety*

Maurice J. Moriarty

enty-ninth birthday on November 28. He has been associated with the paper industry for sixty-four years; since, in fact, he got his first job at the age of fifteen with the Bay State Paper Company of Springfield, Massachusetts. Mr. Moriarty rose from this $3-a-week position to the prominent place he now holds in the paper industry.

Mr. Moriarty was formerly billing clerk for the Albion Paper Company of Holyoke. He was associated with this company for twenty-nine years. During this period the Albion concern became part of the American Writing Paper Corporation and for ten years after the merger he was manager of the Albion division.

Later Mr. Moriarty started his own paper jobbing business which he maintained until 1926, when he started the present company with his son, Charles F. Moriarty. At work as usual on his birthday, Mr. Moriarty philosophically remarked that "the young men of today want to start where their fathers left off" and that "they must have nothing but the best and they buy on credit and are in debt for years." While the paper industry has become diversified to a point where it is impossible for one man to know every phase of the business, Mr. Moriarty feels that opportunity for success is just as great as it ever was for the man with ability.

◆

▶▶▶ A farewell dinner was tendered *Charles W. Boyce,* retiring secretary of the American Paper and Pulp Association, on December 11 by his friends and associates in the paper association field. The dinner, which was held at the Waldorf-Astoria in New York City, was attended by other secretaries of paper trade associations.

Thomas W. Estabrook

▶▶▶ *Thomas W. Estabrook,* formerly assistant to the general manager of the Eastern Corporation, South Brewer, Maine, is now manager of purchasing at the Brown Company and will be located at the company's Berlin (New Hampshire) offices. Mr. Estabrook had been associated with the Brown Company for more than twenty-five years, prior to his association with the Eastern Corporation.


***I will find a way***

***. . . or make one!***

—Hannibal

**KALAMAZOO VEGETABLE PARCHMENT CO.**

**Parchment — Kalamazoo — Michigan**

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TENAX FELTS

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**Going into 1940 we see tangible signs of activity; we are busy on orders in hand for TENAX FELTS; new mills are starting production; old mills are speeding up.**

**For TENAX FELTS we make this promise: they will serve the trade as productively and profitably as they have for 50 years. For ourselves we promise interested cooperation and service.**

***"Non-Users Are The Losers"***

**LOCKPORT FELT COMPANY**

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75 ton Sulphate Mill with wood room equipment, Digesters, Scott Evaporators, Rotary Incinerators, Screens and Wet Machine.

Complete Bag Plant with Machines.

*For Part'culars Write*

**FRANK H. DAVIS COMPANY**

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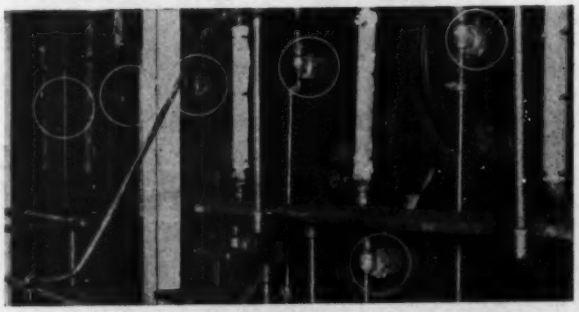
**It's time to replace the old "steamfits"**



**— with JOHNSON ROTARY PRESSURE JOINTS**

*forget:*

1. **Packing.** The special carbon graphite seal-ring totally eliminates packing.
2. **Oiling.** The seal-ring and bearing ring are entirely self-lubricating.
3. **Adjusting.** The joint is pressure-sealed—the higher the pressure the tighter the seal.

The design of Johnson Joints also compensates for both lateral and angular misalignment. There is a Joint for every make of paper machine with any type of drainage. They are saving time, steam, power and speeding up production in scores of mills.

***Ask for latest bulletins.***

**The Johnson Corporation**

845 WOOD STREET THREE RIVERS, MICH.

# ▪ NECROLOGY ▪

## CLIFTON A. CROCKER

One of the best known figures among New England paper manufacturers, Clifton A. Crocker, president of the Crocker-McElwain Company and of the Chemical Paper Manufacturing Company, Holyoke, Massachusetts, passed away suddenly on December 14. He was in his eighty-second year and had been at his office every day.

Mr. Crocker was born in Lawrence, Massachusetts, in 1858, and after finishing school, he entered the offices of what is now the Crocker Division of the American Writing Paper Corporation. Mr. Crocker became treasurer of the company in 1887 and when AWP was organized in the late 90's the Crocker mill was one of the choice properties that went into the combine. Mr. Crocker's father, the late Samuel S. Crocker, was financially interested in the original mill.

Mr. Crocker joined the new company and was purchasing agent for the Eagle A until 1904, when he resigned. He and his brother-in-law, R. Franklin McElwain, founded the Crocker-McElwain Company and their success was immediate. In 1913 they bought the Chemical Paper Manufacturing Co.

Mr. Crocker was a papermaker of the old school. When in 1929 it became apparent that the Chemical Company equipment was obsolete, he planned a renovation program that cost several hundreds of thousands of dollars and the mill was modernized to compete with the best in the country. Just a year ago, when the same problem confronted the Crocker mill, he chose to do the same thing.

Besides his activity as an astute business man, Mr. Crocker was instrumental in establishing a model system of the maintenance of a steady wage scale and brought labor and management closer together. He was associated with a number of civic and business organizations.

◆

## F. A. SILCOX

F. A. Silcox, chief of the United States Agriculture Department's forest service, passed away December 20 at his home in Alexandria, Virginia.

Mr. Silcox, a native of Columbus, Georgia, attended the College of Charleston at Charleston, South Carolina, and Yale University, where he received a degree in forestry. He entered the federal forest service in 1905 and was a regional forester when the World War began. Mr. Silcox entered the army as a major. After the war he engaged in industrial relations work in New York until his appointment as chief forester.

◆

## JOSEPH P. HEILBRONN

Known as the "father of the paper trade" in the Philippines, Joseph P. Heilbronn, founder of the paper company which bears his name in Manila, passed away December 4 in San Francisco. He was 71 years old.

Mr. Heilbronn, who is also known as being one of the first to respond to President McKinley's call to arms in 1898 to become a member of the First California Volunteers, had been associated in former years with the firm of Blake, Moffitt and Towne, San Francisco paper concern. He returned to the Philippines as a peacetime soldier and established his own company, the J. P. Heilbronn Company. Although his interests have been at Manila, Mr. Heilbronn had made his home in San Francisco for the past several months because of ill health. He is survived by his widow.


THE DRAPER FELT

Unexcelled for strength, openness, resiliency, and general running qualities. Made to meet the most exacting conditions on all types of machines and all kinds of papers. Only one grade and that the highest.

*Made by*

DRAPER BROTHERS COMPANY
CANTON, MASS.

*Woolen Manufacturers Since 1856*

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of STAINLESS STEEL—COPPER—BRONZE—
MONEL—CHEMICAL RESISTING ALLOYS
Perforations that are accurate in size and alignment
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EVAPORATORS & FILTERS for Pulp Mills
SWENSON EVAPORATOR COMPANY
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DIXIE AND KOSMOS
PARIS BLACKS

Blacks known for their tone, strength and miscibility. They assure smooth, unvarying shades that last.

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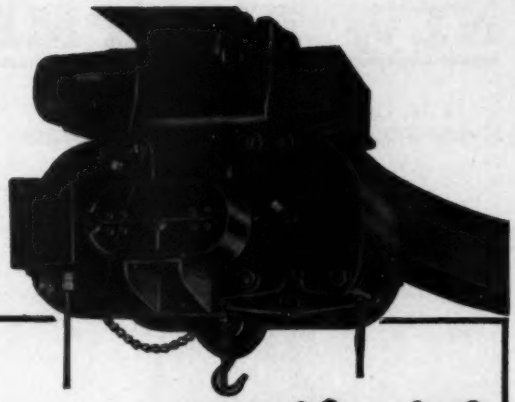

**Motor Trolleyize**

**A-E-CO LO-HED Class B Hoists at a moderate cost**

If you already own a Class B, A-E-CO Lo-Hed hoist or are going to buy one, consider the advantages of adding the new low cost Type RB Motor Driven Trolley when:

1. The haul is long or often repeated.
2. The path under hoist is obstructed.
3. Speed is an important factor.

For high-lights of this new motor trolley see A-E-CO POINTS (below). For full details write for the RB folder today.

A-E-CO POINTS

- Separate unit attachable to any Lo-Hed Class B. hoist.
- Short wheel base—turns any curve of 7' radius or over.
- Low headroom.
- Four wheel drive.
- Choice of 2 trolley speeds—100 and 150 F. P. M.
- Trolley balanced by adjustable counter-weights.
- Heavy duty ball bearing hoist service motor.
- Hyatt roller bearings.
- Cast steel trolley wheels with machined rolling surfaces.
- Cast steel housing.
- Alemite fittings . . . Remember—

LO-HED COSTS LESS PER LIFT

**AMERICAN ENGINEERING COMPANY**

A-E-CO Lo-Hed HOISTS

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*Classified phone directories list the local A-E-CO representatives in principal cities. Call him in, or write us for hoist catalog.*
OTHER A-E-CO PRODUCTS: TAYLOR STOKERS
MARINE DECK AUXILIARIES • HELE-SHAW FLUID POWER

# NEW EQUIPMENT AND SUPPLIES

## Hand Washing Shower

A hand washing washer, made in three models and designated as the *Showerway,* has been announced by Lyon Metal Products, Inc., Aurora, Illinois. One model is for use where electricity and running water are not available; another, where electricity is available but not running water; and the third, where both electricity and running water are available. The first unit makes use of a hand filled tank, kerosene stove heated; the second, a hand filled tank, electrically heated; and the third, a float controlled tank electrically heated. The over-all sizes of each of the three models are the same—width 25 in., depth at top 16½ in., depth at bowl 28¾ in., depth at bottom 24½ in., height 53 in. Finish for the units is in two tones of green. In operation, a push of a plunger provides soap and a slight pressure on a foot pedal showers the water.

## Tannic Acid Preparation for Burns

A tannic acid preparation for burns, known as *Tannoid,* has been announced by the Davis Emergency Equipment Company, 55 Van Dam Street, New York. The preparation consists of a water soluble jelly containing the proper proportion of tannic acid; it is non-freezing at temperatures as low as 20 degrees below zero, Fahr.; and is supplied in 5 oz. and 1½ oz. tubes, and in unit cartons containing six ⅛ oz. tubes.

## Gravity Feed Oiler

A new line of visible gravity feed oilers, made in one, two, four and eight ounce capacities, has been announced by the Trico Fuse Manufacturing Company, Milwaukee. All metal parts of these oilers are cadmium-plated. A ratchet control permits the oilers to be adjusted for any predetermined number of drops of oil per minute. Filler-caps are dustproof and self-closing. Reservoirs for these oilers are stated by the manufacturer to be unbreakable.

## Aniline Press

An aniline press, permitting precision color printing at high speeds, has been announced by the Kidder Press Company, Dover, New Hampshire. All adjustments to this press can be made from one side. Means are provided to separate the impression and plate cylinders and ink rollers when the press is shut down, and still permit rotation of the inking rolls. This press also is provided with an infeed control unit which relieves the type rolls of having to pull the paper under heavy tension, with the Link-Belt system of rewind, with extra large fountain rolls to facilitate ink control, with a means for the precision adjustment of inking roller against plates, and with antisplash guards. The ink fountain pens

are drained easily and may be removed quickly for overnight cleaning. When necessary to remove the plate cylinder, the turn of a wing nut unlocks the bearing.

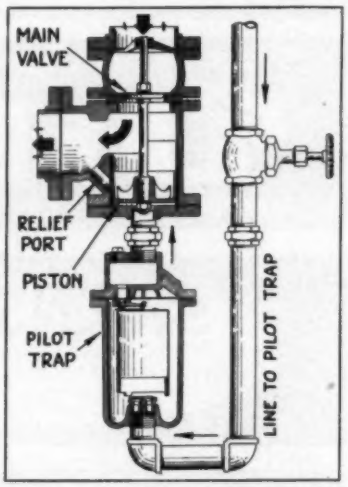
The press, known as the *Kidder Aniliner,* is offered in one to six colors, with gravure units optional. The large machine are provided with a platform system. A variety of thread-ups is possible. Widths run from 26 to 72 inches, and the circumferential range is from 15 to 36 inches.

## Hydraulic Supercalender

The Textile-Finishing Machinery Company, Providence, Rhode Island, has announced a new hydraulic supercalender. This supercalender, an eleven roll stack being illustrated, operates at speeds up to 2000 f.p.m.; has all rolls equipped with roller bearings; is equipped with patented hydraulic attachments which permit instantaneous on-and-off action with means for easy variation to any lineal pressure desired; and has quick and accurate differential adjustment of pressure on either side of the calender. The entire operation of the calender is under finger tip control.

## Giant Steam Trap

A giant steam trap, with 6-in. pipe connections and continuous flow capacity for 300,000 lb. of water per hour at 50 lb. pressure, has been announced by Armstrong Machine Works, Three Rivers, Michigan.



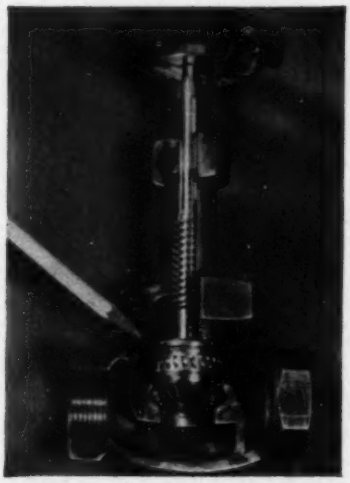

The unit consists of a large inverted bucket-type pilot valve and a piston-operated main valve. It is offered by the manufacturer for the automatic drainage of large steam purifiers, separators, flash tanks, heat exchangers, continuous blowdown systems, multiple effect evaporators, etc.

## Pipe Bender

A pipe bender that handles rigid conduit and pipe from 1¼ to 4 in. in diameter has been announced by the Blackhawk Manufacturing Company, Milwaukee. The bender, designated as Model S-36, weighs 190 lb.; is portable (pivot shoes on ends of frame serve as wheels); and is equipped with a 20-ton hydraulic unit. The hydraulic unit also can be used with special attachments for pulling gears and pulleys or for lifting over long spans at any angle.

## Steam Valve

Ostlind Valve, Inc., Portland, Oregon, has announced the introduction of a steam valve with a disc which rotates up to 2,000 r.p.m. for a moment preceding closing. The disc, mounted on spindle against a stainless steel ball bearing, does not spin when valve is cracked or while throttling. A reversing chamber directs steam flow to turbine vanes



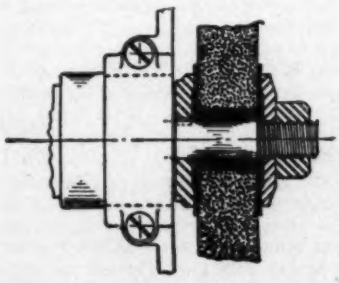
just before disc descends into seat, the turbine vanes being shielded from steam flow when valve is open.

The manufacturer states that the spinning disc prevents scale and other foreign particles from becoming caught in the line of seating and also that it polishes the line of closure, creating a complete metal-to-metal contact between seat and disc, thus preventing wire drawing.

The valve, built in sizes from ½ in. up, is the invention of Joel Ostlind.

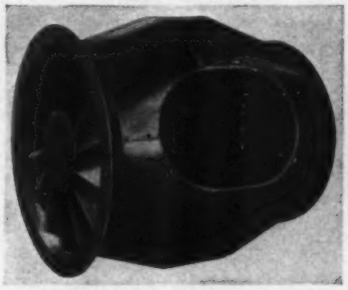
## Grinding Wheel Bushing

The Manhattan Rubber Manufacturing Division, Passaic, N. J., has announced a resilient mounting for grinding wheels of its manufacture. This mounting, designated as the V. D. B. (*Vibration Damper Bushing*), it is claimed by the manufacturer, increases grinding wheel life, reduces machine maintenance costs, permits better grinding finish to be obtained, and increases operator efficiency. No changes in existing equipment are required to make use of this mounting.



## New Ventilating Unit

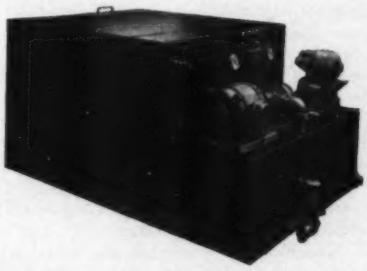
A new ventilating unit, designed to remove corrosive, toxic, high temperature and hazardous fumes, has been announced by the DeBothezat Ventilating Equipment Division, American Machine and Metals, Inc., East Moline, Illinois. Known as the De-Bothezat *Bifurcator*, the unit consists of an



axial-flow pressure fan mounted in a patented housing with the motor set in a separate built-in chamber, entirely isolated from the air flow. Made in sizes from 8 in. to 48 in. and in a wide range of metals and alloys, the unit can be installed as an integral part of the duct system without directional change in air flow.

## Forced Feed Lubrication System

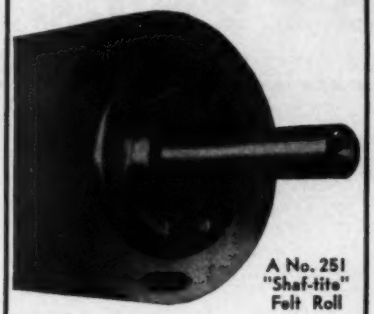
The De Laval Separator Company, 165 Broadway, New York, has announced the development of a forced feed lubrication system to meet varied industrial requirements. The system, designated as *Unilube*, is available in three types—single, double and dual; and is designed to handle any range of oil viscosities, including oils having a viscosity of approximately 2400 S.S.U. at 100 deg. Fahr. The capacity of each type ranges from 1 to 30 g.p.m. Each unit is complete with baffles, level gauges, single dial thermometer, thermostatically controlled steam heating coil, pressure filter, and pump, all completely piped and mounted on a welded steel tank.



## Corrosion-Resisting Paint

The B. F. Goodrich Company, Akron, Ohio, has introduced a paint and primer for use under extremely corrosive conditions. The paint, designated as *No. 495 Korolac*, gives a semi-glossy black finish. Both the primer and paint can be applied by brushing or spraying. When thoroughly dry, the paint, according to the manufacturer, will withstand all acids, alkalies and salts in the concentrations commonly met with in industry, up to a temperature of 150 deg. Fahr.


"SHAF-TITE"
FELT ROLLS THAT WILL SAVE MONEY AND TROUBLE



A No. 251 "Shaf-tite" Felt Roll

• *Write today*

for prices and proof of "Shaf-tite" superiority. More strength due to patented shaft anchorage. Light, easy to handle, with special rot-resisting surface . . . ROHUNTEX treated.

RODNEY HUNT MACHINE COMPANY
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LININGS
FOR EVERY LINEABLE PULP AND PAPER MILL TANK, CHEST AND VESSEL

The fact that in nine of the larger mills 273 Stebbins lined tanks and vessels are installed is proof of their all-around superiority. Stebbins linings are installed in over 90% of the sulphite digesters on the North American continent. This is further evidence of Stebbins leadership.

Consult a Stebbins engineer on all your lining problems.

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# TECHNICAL DEVELOPMENTS

**The following abstracts are of the latest developments found in the foreign press.**

## Testing Newsprint by Trial Printing

Experimental results of work carried out in the Holmens Bruks och Fabriks Artebolags laboratory at Hallstavik. After discussing briefly the working of printing presses, the author describes a trial printing. The ink is weighed on a sensitive balance, transferred to a 40 x 50 cm glass plate and, rolled out with a soft rubber roller (4 cm diam x 24 cm length) until a uniform layer covers the entire plate. Evenness is essential. Test papers to be printed (with a circular area of 1 $dm^2$) are carefully placed on the ink layer, but in such a way that they are not inked all over. For this reason circular pieces of newsprint (0.15 $dm^2$) are placed beneath each test piece, touching the circumference of the latter. After the desired number of test pieces are on the plate, a sheet of newsprint is placed over them, and a (4 cm x 24 cm) definitely weighted rubber roller is passed to and fro over them a certain number of times. The covering sheet is then taken off, and the test pieces removed by forceps and kept for a fixed time, after which photometrical measurements are made. It was found unnecessary to weigh test sheets before and after printing, a fact determined in a series of preliminary experiments.

Using a Davis opacimeter, photometric determinations were made for degree of blackness and strike-through (the latter is really taken as a sum of "show-through"and the ordinary "strike-through"). If the light reflection from unprinted paper is designated as A, that from the unprinted side of test piece as B, and that from the printed side of the test piece as C; the generally accepted equations are:

$$\% \text{ blackness} = \left(\frac{A-C}{A} \cdot 100\right);$$ and per

$$\text{cent strike-through} = \left(\frac{A-B}{A} \cdot 100\right).$$ These

percentages do not however agree with the visual perception of different degrees of blackness. For example: the difference between two surfaces with zero and 10% blackness is very weakly perceptible visually. However the difference between 90 and 100% blackness is strongly perceptible to the eye. This is explained by Weber-Fechner's psycho-physical law. Visual perception of differences between varying degrees of blackness do not correspond to subtractive differences in reflection of light, but to the ratio of these. For this reason, the impression on the eye is directly proportional to the logarithm of the percentage of light reflection. When the inking intensity is to be expressed numerically, the graduation of unlike degrees of blackness should be correlated with the visual perception. A new mathematical formula was introduced therefore. The papers degree of blackness equals log A-Log C. The strike-through equals Log A-Log B.

In these experiments a commercial Swedish newspaper ink (stored in airtight jar) was used. The quantity of the ink in the plate was expressed in mg. ink/$dm^2$ (which was termed the ink coverage). A series of trial printings were made with ink coverages of 30, 50 and 60 mg. The loads on the rubber roller varied from 3 to 40 kg.

As a result of these orientating experiments, it was found expedient to use a coverage of 50 mg/$dm^2$ and a roller load of 15 kg (equal to a line pressure approximating 0.6 kg/cm). The quantity of ink absorbed by a paper and the degree of blackness varies with the number of rollings. The absorption of ink by the roller was also studied. When the roller is completely saturated with ink, and when the details are carefully standardized, values obtained are entirely reproducible. Gelatine rollers proved unsatisfactory for experimental purposes.

The following points were also investigated:—(a) the interval between trial printing and determination of the degree of blackness and strike-through. (b) influence of temperature, specific strike-through (and degrees of strike-through as compared with different basis weights of paper); (c) comparative investigations of newsprints of different makes; (d) trial printings of the same paper after a 2½ year interval; (e) trial printings at high pressures with steel cylinders (f) quantitative relationship between the amount of ink used and the degree of blackness and strike-through at high pressures.

It was found advisable never to make photometric determinations before 24 hours had elapsed. Prior to opacimeter tests, the sample discs were kept at 20 deg. C. and 50% humidity. As a result of careful tests it was shown that the quantity of ink absorbed by the paper during the printing is a linear function of the ink coverage of the plate. The strike-through is also a linear function. At the outset, the degree of blackness increases rapidly with the quantity of ink, and thereafter approaches a limit representing perfect blackness. The strike-through is much greater when the wire side of the paper is printed (*i.e.* strike-through appearing on the top side). In general tests were made by measuring only strike-through on the wire side, when the paper was printed on the top side. And each paper has a specific strike-through value. This permits the direct comparison of specific strike-through values for various papers, but the basis weight must also be considered. Various samples of newsprint (outside of Europe) were tested not only for printability, but for basis weight, Bekk smoothness, Gurley smoothness, porosity, oil penetration, etc.

The method of computing time during which the paper is subjected to the pressure in trial printing is fully explained. The pressures obtained were equal to those obtaining in large printing presses.

The general conclusions reached after a series of experiments were that the differences in deg. of blackness found in ordinary trial-printing with rubber rollers, recur on a practically unaltered scale in printing with a steel roller loaded with 10 kg. There is a strong possibility that the "dissimilarities of degrees of blackness shown by trial printing will occur on an undiminished scale in practical printing."

The author has also shown an important relationship between quantity of ink, degree of blackness and strike-through at high pressures. The risk of obtaining a high degree of strike-through is obvious when the printer tries to get as black as possible a print. At the very high degree of blackness, increases in ink quantity cause only slight intensification of blackness (or none) whereas the strike-through increases sharply. However as the strike-through does not appear instantly, the printer may not observe it and be warned by it. A greyish tone rather than a deep black tone is advisable in printing newspaper.

The limitations of trial printing are also briefly discussed. For example, it provides no expression for the capacity of a paper to absorb printing ink and of the rate of fixation. Hence it does not show those properties which a paper must have to avoid "set-off" in printing. However, a means of measuring this is described. After testing 60 inks in the Hallsta Laboratory, it becomes evident that greater differences exist between inks, with regard to strike-through, than in the differences found in various samples of newsprint. The author intends to publish tests made on printing inks. Gosta E. Carlsson, Paper-Maker and British Paper Trade J. 98, (T. S.) 113-129 (1939).

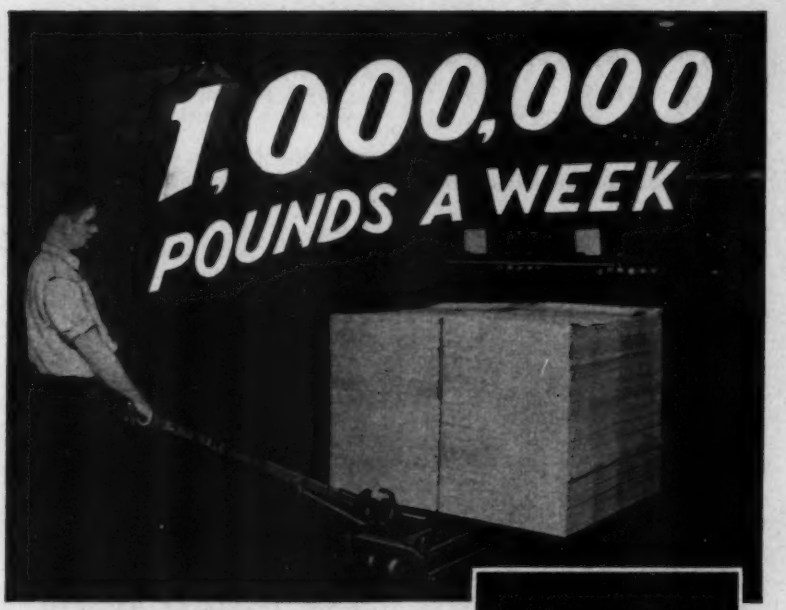
## Pitch Troubles

The results of a large number of investigations have been reviewed. There have often been contradictory results. The three main reasons for pitch troubles seem to be (1) pulp used, (2) installations in the mill, (3) variations or irregularities during the operation. The latter include size, process water, acidity, etc. A factor which is generally agreed upon is that the total extractable resin is *not* directly proportional to the pitch trouble. A large number of pulp samples from various mills showed ether extracts ranging from 0.8 to 1.33% and the two pulps which gave the most trouble had values of 0.8% and 1.14% respectively. No especial component of an extractive could be held respon-

sible for the pitch trouble. However it was shown that these extractives had to be dried in vacuo (not at 100 deg.). Evidently the samples giving pitch troubles gave extractives with the lowest softening points. Experiments which sought to trace the harmful resinous components back to the rosin freed from ray cells by cooking, did not give results which could differentiate sharply between harmful and harmless rosin or which could be used in predicting the behavior of the pulp. Eventually a combination of physical and chemical analysis may solve the pitch problem. Certain pulps always give pitch problems irrespective of treatment. There is a relationship between pH and pitch deposits, for example in the beater. At pH 4-4.5 there is an increase in deposition which then decreases up to pH 6. A maximum at pH 7 is followed by a decided drop in the alkaline range. The author points out that two machines operating seemingly under identical conditions and using identical pulp may not give similar results. On one, pitch troubles may be experienced while the other may be free from such troubles. The method of conveying pulp from the beater to the wire seems important. Dead corners and sharp bends are to be avoided. In the former, slime deposits show a special affinity for pitch, a finding not usually realized. Pitch samples from such a dead corner and from the first press gave similar analyses. Cleanliness is therefore of prime importance. The introduction of air into pulp suspensions has a harmful effect, especially when the dilutions are high. Sigurd Samuelson. Papir-J. No. 16, 224-38 (1939), through Bull. Inst. Paper Chem. 10, No. 3 (1939).

## Selection of Pulpstones

It is difficult to obtain a quantitative estimate for measuring the properties of a pulpstone, on which so many of the qualities of mechanical pulp depend. The author considers that the most suitable expression for the quality of groundwood is the ratio: B/T, where B is the burst factor (which should be as high as possible) and T, the freeness of the rate of dewatering (which should be as low as possible). The pulpstone is nonuniform. Hence it is impossible to determine its properties prior to use. The stone manufacturer must maintain a type which gives the most uniform practical results. The B/T for a number of pulpstones was determined. These were artificial cement and ceramic pulpstones as well as natural stones. Curves are given. Each stone appears to have an optimum ratio. The influence of burring, power consumption and wear of the stone on pulp quality are given. Ordinarily these values do not vary sufficiently for different types that they need to be considered in the choice of a stone. An essential prerequisite is the safety factor; i.e., that the stone will not burst during its use. The most important factor for the selection of a pulpstone remains the quality of the pulp produced. H. O. Stretmo. Papir-J. 27. No. 17,287-8, 290, 292; also Finnish Paper Timber J. 21, No. 14,515-7 (1939) through Bull. Inst. Paper Chem 10, No. 3. 103 (1939).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YALE HAND LIFT TRUCKS

Taking into consideration the various movings, there are over 1,000,000 lbs. of quality paper being handled every week at the Dalton, Massachusetts, plant of the Byron Weston Company, leaders in ledger paper. This is a real handling problem that brooks no inefficiency. The slightest laxity, and production would be slowed up all along the line—resulting in higher costs at the expense of profits.

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*"But above all, one thing stands out—THEIR AMAZING ECONOMY."* That's a statement which reflects Yale service to a "T." Easier to operate — Cheaper to maintain . . Yale Hand Lift Trucks have proven by actual on-the-job service their uncanny ability to cut handling costs to the very bone. No wonder plants which use them are so enthusiastic!

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THE FAMOUS YALE BLUE STREAK — Single Stroke Hand Lift Trucks 2,500 Lbs. Capacity.
NARROW FRAME MODEL
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THE YALE & TOWNE MFG. CO.
PHILADELPHIA DIVISION, PHILADELPHIA, PA., U. S. A.
IN CANADA: ST. CATHARINES, ONT.

# PAPERMAKING PATENTS

IN THE UNITED STATES—Compiled by James Atkins, Registered Patent Attorney

Inquiries should be addressed to James Atkins, Munsey Building, Washington, D. C.

## Paper for Nitration

Patent No. 2,159,675. George A. Richter, Berlin, N. H., assignor to Brown Company, Berlin, N. H., a corporation of Maine. Application June 11, 1936, Serial No. 84,707. Renewed October 10, 1938. 4 Claims. (Cl. 260—222). A waterleaf nitration paper comprising substantially unbeaten, bleached, sulphite hardwood pulp having an alpha cellulose content not greater than about 90% and ether-soluble constituents amounting to not more than 0.3%, said paper being uniformly textured and readily penetrated throughout by nitrating acid and having a compactness of at least 60 and a thickness not exceeding 0.01 inch.

## Paper Manufacturing

Patent No. 21,098. George S. Carroll, Bennington, N. H. Original No. 2,064,647, dated December 15, 1936, Serial No. 58,724, January 11, 1936. Application for reissue July 15, 1938, Serial No. 219,469. 7 Claims. (Cl. 34—24). In the drying of a running matted fibrous web the opposite sides of which have different heat transfer characteristics, the method which comprises supplying heat to both sides of the web to take moisture from both sides thereof and supplying heat to the one side of the said web at a controlled temperature different from the controlled temperature at which heat is supplied to the other side of the said web to produce the desired relative drying of the two sides to obtain a sheet substantially free from tendency to curl.

## Paper Treatment

Patent No. 2,155,731. Harold S. Mitchell, Chicago, Ill., assignor to Industrial Patents Corporation, Chicago, Ill., a corporation of Delaware. Application September 13, 1935, Serial No. 40,460. 1 Claim. (Cl. 91—68). The method of treating paper stock for use in packaging products containing fats and oils which consists in incorporating a citric acid solution in the paper stock.

## Fiber Pulp Refiner

Patent No. 2,156,321. Daniel Manson Sutherland, Jr., Morrisville, Pa., assignor to Lionel M. Sutherland, Trenton, N. J., and Douglas G. Sutherland, Morrisville, Pa. Application April 1, 1936, Serial No. 72,083. 14 Claims. (Cl. 92—26). A fiber pulp refiner comprising relatively revolving coaxial refining members with opposed coacting working faces substantially parallel and enlarging outward around their axes, and traversed transversely of the circumferential direction of the relative movement of their said faces by the fiber stock being treated, at least one of said refining members having a flexible facing for coacting directly with the working face of the other refining member and being provided with means for applying sustaining fluid pressure behind said facing to maintain effective coaction with said other member.

## Self-Adjusting Felt Roll for Paper Machines

Patent No. 2,163,163. Milton T. Weston, Red Bank, N. J. Application April 22, 1938, Serial No. 203,639. 6 Claims. (Cl. 34—48). A self-adjusting felt roll for the felts on the dryer section of a paper machine, comprising in combination a revolvable tubular roll, a torsion shaft on which said tubular roll freely revolves, said torsion shaft having gear elements mounted on the ends thereof by which it may be turned and by which it is movably supported, gear racks oppositely disposed on the side frames of the paper machine and engaging the said gear elements on said shaft, and torsion means mounted on one end of said shaft to maintain a constant turning effort therein to effect a resulting parallel movement of said shaft and said roll with respect to said felt.


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MACHINE WORKS, Inc.
GLENS FALLS, N. Y.

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Improved Rogers and Special Wet Machines

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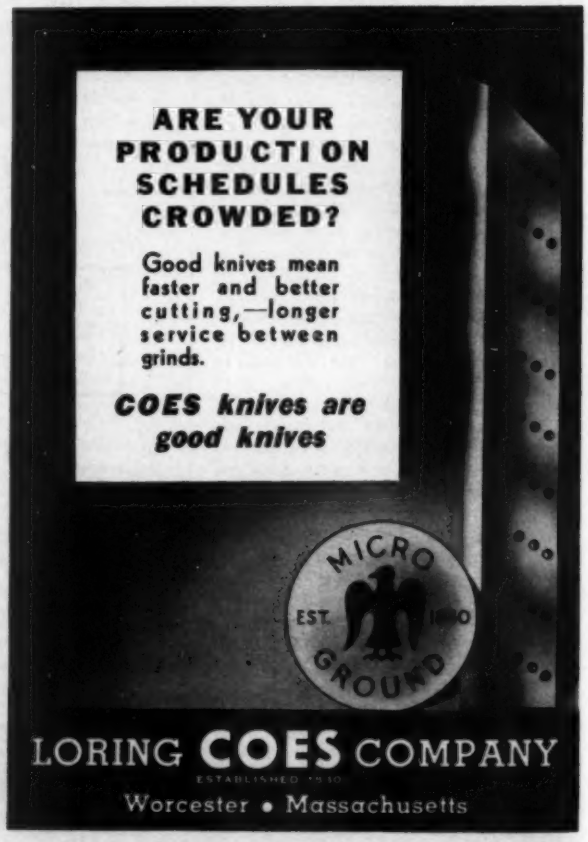
Glens Falls Decker and Decker Washer

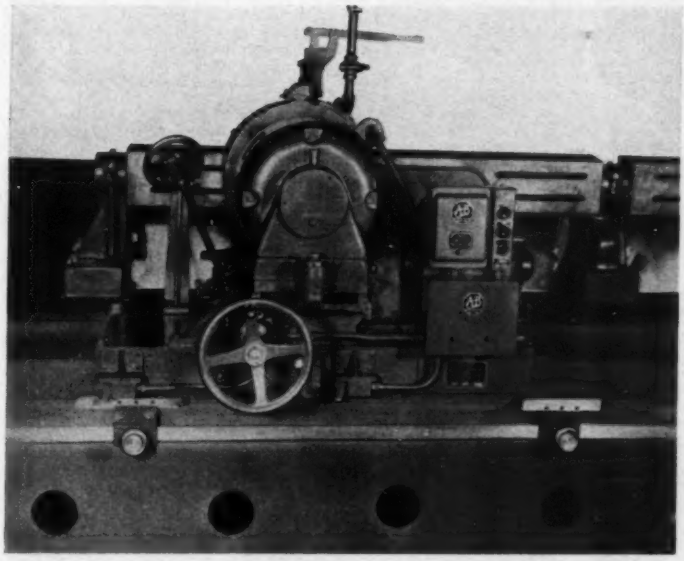
Glens Falls Rotary Sulphur Burner

Pulp Grinders, Three or Four Pocket

*Write for descriptive literature*

# AUTOMATIC KNIFE GRINDER



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BIG RAPIDS, MICHIGAN, U. S. A.

***For Doctor Blades, Paper Knives, Chipper Knives, and all flat, bevel or concave grinding***

Precision construction with extra strength working parts not only provide the accuracy, durability and production which secures the most economical operation in the actual doing of the work, but in addition save time, knife and grinding wheel expense.

The above illustration showing the principal working parts and a section of the heavy knife bar and supports, of the Mammoth Traveling Wheel Grinder, indicates the excess sturdiness of the latest Covel-Hanchett grinder, which with preloaded, precision ball bearings, automatic protected lubrication, and convenient, accurate controls, positively reduces grinding costs and knife up-keep expense. We prove it. You benefit.

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## CAMACHINE 14

For use as winder or re-winder in connection with paper or board machines. Operates at speeds up to 1400 F. P. M.

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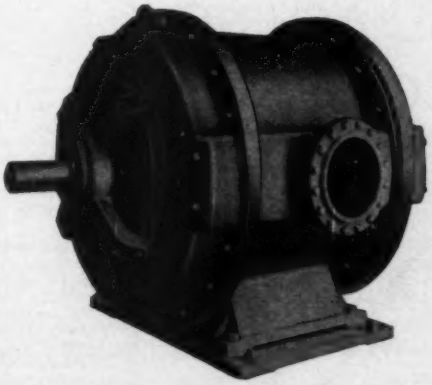

**One Moving Element. Non-pulsating Vacuum. No Internal Wearing Parts. No Internal Lubrication. Handles Liquid With Air. No Expert Attendance. Constant Efficiency. Low Maintenance Cost.**

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SOUTH NORWALK, CONNECTICUT, U. S. A.

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CELLULOSE PURIFICATION


# New Catalogues and Publications

**Audubon Wire Cloth Corp.,** Philadelphia, Pa.—Numerous types of conveyor and processing belts which can be obtained in any ductile metal most resistant to various operating conditions (high temperatures, sub-zero temperatures, corrosion, contamination, abrasion, impact, etc., are splendidly illustrated in a new catalogue (No. 50) recently issued by this firm. The catalogue contains 120 photographic illustrations of various belts which show the various weaves, meshes, and wire diameters and, in addition, there is included four engineering diagrams showing how to design and construct these conveyors for these belts, engineering and operating hints and a questionnaire form listing the information desired by the manufacturer for making recommendations of the correct belt to solve individual problems. This catalogue, from the viewpoint of its interesting presentation together with its actual information, is well worth having.

**Crane Co.,** Chicago, Ill.—An extremely informative bulletin has been issued by this company. The booklet, entitled "Corrosion-Resistant Valves and Fittings," is 56 pages in length and points out the chemical and physical properties of the various alloys and their general behaviour in process piping. Eight pages of the booklet are devoted to the listing of nearly 200 chemical solutions used in process manufacturing. At the top, column headings identify various metals and alloys. Where the horizontal lines of chemical listings meet the vertical columns of metals, colored squares indicate whether the solutions and metals are generally compatible (green), not compatible (red), or that some corrosion may be expected without serious results (orange). This feature alone would make this booklet a valuable piece of reference for any industrial library.

**Farrel-Birmingham Co., Inc.,** Ansonia, Conn.—Much valuable information as to means of guarding against the effects of misalignment of connected machine shafts is to be found in a new illustrated catalogue (No. 443) just put out by this company. The catalogue explains the function of a flexible coupling and describes how Farrel Gearflex couplings compensate for parallel or angular misalignment or a combination of both, illustrating the details of design and construction with a number of halftone plates. Ratings, dimensions, and weights of the various types of flexible couplings manufactured by this company are given, as are applications. Photographs of a number of coupling installations are also contained in the release, which is 44 pages long and punched for loose-leaf filing.

**Foxboro Co.,** Foxboro, Mass.—This company has recently published a 40-page booklet, *Recording Thermometers*, which describes a complete line of recording thermometers for every industrial use. The booklet is illustrated with more than 70 photographs of thermometers, their parts and accessories, and is clearly written. Principles and construction of the new Monotherm system incorporated in all the company's recording thermometers are explained in detail. Several methods of installation are shown. This company has also published a 47-page illustrated bulletin covering the use of flow meters wherever air or gas, liquid or steam is produced and distributed. This booklet contains an interesting discussion of flow problems encountered in various industries and methods of approach to these problems.

**Gilbert and Nash Co., Inc.,** Menasha, Wis.—Combining usefulness and attractiveness to their fullest degree, this company has recently circulated a very valuable manual which presents a complete resumé of the company's guiding equipment. Entitled the "Guiding Manual for Gilbert & Nash Equipment," this 40-page manual contains descriptions and illustrations of some thirty-four different types of standard wire and felt guides. Of unquestionable value are the blueprints included with each description and photographic illustration. The book itself is of the most modern design, being bound in blue with the title in silver. It is bound with a new-style clipper binder which permits the insertion and removal of sheets. Every papermaker should have access to this book, as it is invaluable as a reference.

**Leeds & Northrup Co.,** Philadelphia, Pa.—The entire line of L. & N. line of instruments for research and for routine testing in the laboratory, plant and field, are described in the new 66-page, condensed catalogue just put out by this company. Every standard product is briefly described and most of the principal ones are illustrated. The release, known as Catalogue E, will be useful for many instrument users in choosing instruments and accessories for specific work in the laboratory, plant or field, although if the reader wants more detailed descriptions and supplementary information, there are more detailed publications offered by the company. A copy of the catalogue will be sent on request. Address letters to 4934 Stenton Avenue, Philadelphia.

**Macksons Co.,** New York, N. Y.—This company's joint sealing compounds for use on pipe lines and equipment handling steam, gas, oil, water, etc., are explained in an interesting bulletin just released by the company.

**Walworth Co.,** New York, N. Y.—A medium-priced, corrosion and heat resistant cast iron pipe which is recommended by the company for services such as laboratory waste lines, caustic lines, sulphite pulp mill blow pit waste lines, and lines carrying weak suuphuric acid at normal temperatures, is described and illustrated in a new release issued by this concern. Chemical properties of the pipe, together with general applications, are listed.

## BOOKS

**Fearsome Critters**—Thirty-one legendary woods varmints are described and illustrated in this attractive little volume. The author is Henry H. Tryon; the illustrator, Margaret Ramsay Tryon. There is a full page illustration of each varmint; and one page or more is given over to a description of each of them. Included in this list of varmints, just for example, are such legendary woods animals as axe-handle hound, ball-tailed cat, Columbia Rivers and squink, come-at-a-body, dingmaul, dungavenhooter, hidebehind, hodag, hoop snake, santer, side-hill gouger, squonk, tote-road shagamaw, and the wampus cat. The author has been collecting these tales for a good quarter of a century, and it is believed that the volume should prove of interest to any one interested in the folklore of American logging and lumbering. Printed by The Idlewild Press, Cornwall, N. Y., the book is priced at $2.00 a copy.

**Fluid Flow Measurement by Head Type Metering Elements**—This booklet, published by The Instruments Publishing Company, 1117 Wolfendale St., Pittsburgh, Pa., contains two articles—one covered by the above title, the work of F. C. Stewart and J. S. Doolittle, both of the Pennsylvania State College; the second, entitled "New Trends in Rate-of-Flow Measurement," the author of which is Kermit Fischer of Fischer & Porter Co. It is a paper-covered publication and has a page size of 8⅝ in. by 11¾ in. Designated as Instruments Little Texts, No. 1, the booklet is priced at 50 cents a copy by the publisher.

NO, the grass is not a bit greener across the fence — not to our eyes, at least. Lindsay is not to be lured from a single purpose deliberately chosen some 36 years ago. Three and a half decades spent in the same pasture — in the paper "field," if you please — and we are well content. During that period the quality of paper and the processes of manufacturing it have advanced tremendously. If that progress has been furthered in some measure by the studied excellence of Lindsay Fourdrinier and cylinder wires, we are glad to have put all our time and effort upon *your* assignment.

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The Case of Maintaining Uniform Tension in Winding Strip Metal

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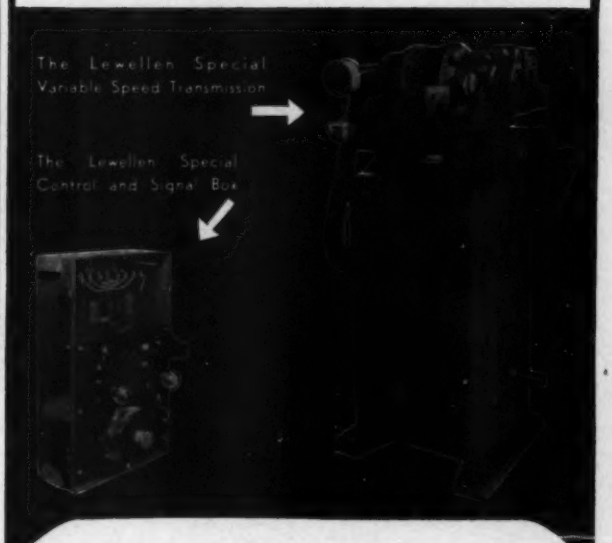
**SOLUTION:** ***A specially designed Lewellen Variable Speed Transmission with Automatic Control (illustrated below).***

**RESULT:** The winding reel starts at its highest speed. As the strip of material on the spool increases in diameter, the control accurately reduces the speed of the reel to maintain uniform tension on the strip as it is wound. *Now, get this!* After the reel has filled and the unit stopped for removing and replacing it with a new core, the control *reverses its position* to allow the new reel to start again at the maximum speed and decrease in speed as it is filled.




THIS PROBLEM is one of hundreds that come to Lewellen each year. Lewellen Engineers are constantly finding better ways to control production machines profitably. Often, results are *amazing.*

You appreciate the importance of the proper application of modern speed control to your production machines. *So, why not call a Lewellen Engineer today?* Whether your needs are small or large, the vast experience acquired by Lewellen Engineers over a period of more than 40 years is yours for the asking.

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# LEWELLEN

*Variable Speed* { TRANSMISSIONS / MOTOR PULLEYS

# CURRENT MARKET QUOTATIONS

## RAGS (Domestic)
*f. o. b. New York City*

NEW RAGS

| | per cwt. | |
|---|---|---|
| Blue Overalls | 5.00 to | 5.25 |
| Corduroy | 2.75 to | 3.00 |
| **Cottons—** | | |
| Washables, No. 1 | 2.15 to | 2.50 |
| Fancy Percales | 3.25 to | 3.50 |
| New Soft Blacks | 3.75 to | 4.00 |
| New Light Seconds | 1.75 to | 2.00 |
| New Dark Seconds | 1.60 to | 1.75 |
| **Khaki Cuttings—** | | |
| Mixed | 3.00 to | 3.25 |
| O. D. | 3.50 to | 3.75 |
| New Canvas | 8.00 to | 8.50 |
| New Mixed Blacks | 2.50 to | 2.75 |
| **Shirt Cuttings—** | | |
| New White No. 1 | 7.50 to | 7.75 |
| Silesias No. 1 | 4.75 to | 5.00 |
| New Unbleached | 7.50 to | 7.75 |
| Fancy | 2.25 to | 2.50 |

## RAGS (Domestic)
*f. o. b. New York City*

OLD RAGS

| | per cwt. | |
|---|---|---|
| **Roofing—** | | |
| No. 1 | 1.45 to | 1.50 |
| No. 2 | 1.25 to | 1.30 |
| No. 3 | 1.15 to | 1.20 |
| **Twos and Blues—** | | |
| Repacked | 2.00 to | 2.25 |
| **Thirds and Blues—** | | |
| Repacked | 1.80 to | 2.00 |
| Miscellaneous | 1.65 to | 1.75 |
| **White, No. 1—** | | |
| Repacked | 3.00 to | 3.25 |
| Miscellaneous | 2.75 to | 3.00 |
| **White, No. 2—** | | |
| Repacked | 2.50 to | 2.75 |
| Miscellaneous | 2.00 to | 2.25 |

## RAGS (Foreign)
*ex dock New York City*

NEW RAGS — per cwt. — Nominal

New Dark Cuttings
New Mixed Cuttings
New Light Silesias
Light Flannelettes
Unbleached Cuttings
New White Cuttings
New Light Oxfords
New Light Prints

## RAGS (Foreign)
*ex dock New York City*

OLD RAGS — per cwt. — Nominal

No. 1 White Linens
No. 2 White Linens
No. 3 White Linens
No. 4 White Linens
No. 1 White Cottons
No. 2 White Cottons
No. 3 White Cottons
No. 4 White Cottons
Extra Light Prints
Ord. Light Prints
Med. Light Prints
Dutch Blue Cottons
French Blue Cottons
French Blue Linens
Checks and Blues
Linsey Garments
Dark Cottons
Old Shopperies

## ROPE and BAGGING
*f. o. b. and ex dock New York City*

| | per cwt. | |
|---|---|---|
| **Gunny No. 1—** | | |
| Foreign | 2.50 to | 2.75 |
| Domestic | 2.50 to | 2.75 |
| **Wool Tares—** | | |
| Light | 2.15 to | 2.25 |
| Heavy | 2.25 to | 2.40 |
| No. 1 Scrap Bagging | 2.10 to | 2.25 |
| **Manila Rope—** | | |
| Foreign | 4.50 to | 4.75 |
| Domestic | 4.50 to | 4.75 |
| New Burlap Cuttings | 3.50 to | 3.75 |
| **Jute Threads—** | | |
| Foreign | 3.50 to | 3.75 |
| Domestic | 3.25 to | 3.50 |
| **Strings—** | | |
| Sisal | 2.25 to | 2.50 |
| Soft jute | 3.25 to | 3.50 |
| Mixed | 1.00 to | 1.25 |

## WASTE PAPER
*f. o. b. New York City*

| | per cwt. | |
|---|---|---|
| **Shavings—** | | |
| White Envp. Cuttings | 2.85 to | 3.10 |
| Ord. Hard White No. 1 | 2.25 to | 2.50 |
| Ord. Soft White No. 1 | 2.00 to | 2.25 |
| Soft White, Extra | 2.50 to | 2.65 |
| **Flat Stock—** | | |
| Stitchless | .95 to | 1.00 |
| Overissue Mags | .90 to | .95 |
| Solid Flat Book | .80 to | .85 |
| Crumpled No. 1 | .65 to | .70 |
| Solid Ledger Books | 1.75 to | 1.90 |
| **Ledger Stock—** | | |
| White | 1.50 to | 1.65 |
| Colored | 1.05 to | 1.15 |
| New B. B. Chips | .35 to | .40 |
| **Manilas—** | | |
| New Env. Cuts | 1.90 to | 2.00 |
| New Cuttings | 1.80 to | 1.90 |
| Sulphite Wrappers | .35 to | .40 |
| No. 1 Old Kraft | 1.00 to | 1.10 |
| **News—** | | |
| No. 1 Wh. News Cuttings | 1.75 to | 1.85 |
| Strictly Overissue | .80 to | .85 |
| Strictly Folded | .50 to | .55 |
| No. 1 Mixed Paper | .32½ to | .35 |

## CHEMICALS
*f. o. b. shipping point*

| | | |
|---|---|---|
| **Alum (Papermakers)—** | | |
| Lump, cwt. | 3.40 – | |
| Ground, cwt. | 3.15 – | |
| Powdered, cwt. | 3.55 – | |
| **Blanc Fixe—** | | |
| Pulp, bulk, ton | 40.00 to | 45.00 |
| Dry, barrels, pound | .0350 to | .0340 |
| **Bleaching Powder—** | | |
| Drums, cwt. | 2.00 to | 3.00 |
| **Casein (Domestic Standard)—** | | |
| 20-30 mesh (bags), lb. | 16.50 to | 17.00 |
| 80-100 mesh (bags), lb. | 17.50 to | 18.00 |
| Argentine, lb. | 14.00 to | 14.50 |
| **China Clay—** | | |
| Domestic Filler | | |
| Bulk (mine) ton | 7.50 to | 15.00 |
| Domestic Coating | | |
| Bulk (mine) ton | 11.00 to | 22.00 |
| Imported (ship side) | | |
| Bulk (lump) ton | 20.00 to | 25.00 |
| **Chlorine—** | | |
| Tank cars (wks) cwt. | 1.75 to | 1.90 |
| **Gelatine (silicin), lb.** | .53 to | .55 |
| **Glyc. (C.P.) drums, lb.** | .1250 to | .1300 |
| **Litharge, powd., bbl., lb.** | .08 – | |
| **Rosin (Gum)—** | | |
| New York, 280 lb. barrel | | |
| E, per bbl. | | 6.22½ |
| F, per bbl. | | 6.30 |
| G, per bbl. | | 6.50 |
| WW, per bbl. | | 7.00 |
| **Rosin (Wood), per bbl., carlots** | 4.00 to | 6.45 |
| **Salt Cake—** | | |
| Dom. bulk (wks) ton | 15.00 to | 19.00 |
| Imp. bulk on dock— | | |
| (Atl. ports) ton | | |
| **Soda Ash—** | | |
| Bulk (works) cwt. | .90 to | .95 |
| Paper Bags, cwt. | 1.05 to | 1.25 |
| Barrels, cwt. | 1.05 to | 1.35 |
| **Soda (Caustic)—Ammonia,** | | |
| Solid, drums, cwt. | 2.30 – | |
| Ground and flake, drums, cwt. | 2.75 – | |
| **Sodium Silicate—** | | |
| 60 deg., 55 gal. drums, (works) cwt. | 1.65 to | 2.00 |
| 40 deg., 35 gal. drums, (works) cwt. | .80 to | 1.20 |
| **Starch—** | | |
| Pearl, 140 lb. bags, cwt. | 2.45 – | |
| Pearl, barrels, cwt. | 2.70 – | |
| Paper (Sp.) bags, cwt. | 2.55 – | |
| barrels, cwt. | 2.80 – | |
| **Sulphur (crude)—** | | |
| (mine) bulk, long ton | 16.00 to | 20.50 |
| **Talc—** | | |
| Dom. 100 lb. bags (mine) ton | 15.00 to | 18.00 |
| Imp. bulk, ton | 23.00 to – | |
| **Titanium Dioxide—** | | |
| Barium Pig., bbls., lb. | .08¼ to | .06½ |
| Calcium Pig., bbls., lb. | .05¼ to | .05½ |
| **Zinc Sulphide, bbls., lb.** | .07½ to | .07¾ |

## CHEMICAL PULP
*(Air-dry ton)*

| | per cwt. | |
|---|---|---|
| **Soda (Dom.) del'd. mill—** | | |
| Bleached | 2.90 – | |
| **Sulphate (Dom.) f. o. b. mill—** | | |
| Bleached | 3.25 to | 3.50 |
| Kraft No. 1 | 2.00 to | 2.50 |
| Kraft, Southern, del. | 1.90 to | 2.15 |
| **Sulphate (Imp.) on dock—** | | |
| Bleached | 3.25 to | 3.75 |
| Kraft No. 1 | 2.00 to | 2.25 |
| Kraft No. 2 | 1.90 to | 2.00 |
| **Sulphite (Dom. & For.) On dock—** | | |
| Prime bleached | 2.90 to | 3.15 |
| Prime easy bleach | 2.65 to | 2.80 |
| Prime strong unbl. | 2.40 to | 2.65 |

## MECHANICAL PULP
*(Air-dry ton)*

| | per ton | |
|---|---|---|
| **No. 1 Dom. & Can. (f. o. b. mill)** | 30.00 to | 33.00 |
| **No. 1 Imp. (On dock)—** | | |
| Moist | 38.00 to | 42.00 |
| Dry | 38.00 to | 42.00 |

## PAPER
*f. o. b. New York City*

| | per ton | |
|---|---|---|
| **Boards—** | | |
| Binders | 70.00 to | 82.00 |
| Chip | 45.00 – | |
| Chip, agl. mla. lined | 57.50 to | 60.00 |
| Coated, white patent | | |
| .016 | 75.00 – | |
| .020 and heavier | 70.00 – | |
| Kraft liner | 55.00 – | |
| News | 45.00 – | |

| | per cwt. | |
|---|---|---|
| **Book (cased)** | | |
| No. 1 Glossy Coat | 11.50 to | 13.50 |
| No. 2 Glossy Coat | 10.25 to | 11.75 |
| No. 3 Glossy Coat | 9.55 to | 11.00 |
| No. 4 Glossy Coat | 9.15 to | 10.50 |
| No. 2 Offset | 7.70 to | 9.00 |
| A Grade M. F. | 6.15 to | 6.90 |
| A Grade Super | 6.40 to | 7.15 |
| B Grade M. F. | 5.70 to | 6.45 |
| B Grade Super | 5.95 to | 6.70 |
| B S. & S. C. Litho | 6.20 to | 6.95 |
| B M. F. Litho | 5.95 to | 6.70 |
| Ivory & India | .50 cwt. extra | |
| **Bonds (Rag Content)—** | | |
| 100% Rag | | |
| Ext. No. 1 | 39.10 to | 46.00 |
| 100% Rag | 31.05 to | 36.50 |
| 85% Rag | | |
| 75% Rag | 23.60 to | 27.75 |
| 65% Rag | 20.50 to | 25.00 |
| 50% Rag | 17.55 to | 21.50 |
| 25% Rag | 14.65 to | 17.75 |
| Regular Colors | 1.00 cwt. | extra |

| | per cwt. | |
|---|---|---|
| **Bonds (Sulphite)—** | | |
| No. 1 | 8.95 to | 11.00 |
| No. 2 | 8.05 to | 9.75 |
| No. 3 | 7.60 to | 9.25 |
| No. 4 | 7.30 to | 9.00 |
| Colors | 1.00 cwt. | extra |
| **Glassine (f. o. b. mill)—** | | |
| Embossed (25 lb. up) | 12.75 – | |
| Bleached (25 lb. up) | 11.75 – | |
| Unbleach. (25 lb. up) | 10.25 – | |
| **Greaseproof—** | | |
| Bleach. (25 lb. up) | 10.25 – | |
| Unbleach. (25 lb. up) | 9.25 – | |
| **Ledgers (Rag Content)—** | | |
| 100% Rag | | |
| Ext. No. 1 | 40.25 to | 47.25 |
| 100% Rag | 32.20 to | 37.75 |
| 85% Rag | 29.90 to | 35.00 |
| 75% Rag | 24.75 to | 29.00 |
| 65% Rag | 21.65 to | 26.25 |
| 50% Rag | 18.70 to | 22.75 |
| 25% Rag | 15.80 to | 19.25 |
| Regular Colors | 1.00 cwt. | extra |
| **Ledgers (Sulphite)—** | | |
| No. 1 | 10.10 to | 12.25 |
| No. 2 | 9.25 to | 11.25 |
| No. 3 | 8.50 to | 10.75 |
| No. 4 | 8.50 to | 10.25 |

| | per ton | |
|---|---|---|
| **News—** | | |
| Rolls (Contract) | 50.00 – | |
| Rolls (Spot) | (nominal) | |
| Sheets | 58.00 – | |

| | per ream | |
|---|---|---|
| **Tissues (Carlots)—** | | |
| White, No. 1 | .87½ – | |
| White, No. 2 | .65 – | |
| Anti-Tarnish M. G. | .75 – | |
| Colored | .87½ – | |
| Kraft | .80 – | |
| Manila | .65 – | |
| Napkins, semi-crepe (12½ lb. to M shts.) per cs. | .41 – | |
| Napkins, full crepe and emb'sed (12½ lb. to M shts.) per cs. | .43½ – | |
| Toilet, Bleached (M shts.) per cs. | 5.80 – | |
| Toilet, Unbleached (M shts.) per cs. | 3.50 – | |

| | per case | |
|---|---|---|
| **Towels—** | | |
| Bleached | 3.10 to | 3.65 |
| Unbleached | 1.95 to | 3.30 |

| | per cwt. | |
|---|---|---|
| **Wrappings (Kraft)—** | | |
| Extra Quality | 5.00 to | 5.50 |
| Super-Standard | 4.50 to | 5.00 |
| Northern Standard | 4.25 to | 4.50 |
| Southern Standard | 4.00 to | 4.25 |
| **Wrappings (Sulphite and Bleached Kraft)— (Rolls, f. o. b. mill)** | | |
| Bleached papers— | | |
| M.F. & M.G. Waxing, 20 lb. (Carloads only) (10,000 lbs.) | 6.15 – | |
| Drug wrapp. 35 lb. | 6.40 – | |
| | 6.25 – | |
| Unbleached Papers— | | |
| Com. Grd. Butch. 40 lb. | 4.50 – | |
| No. 1 Butchers | 4.75 – | |
| No. 1 Imit. Parch & Dry Fin. Groc. Sulphite 30 lb. | 5.00 – | |
| No. 2 Imit. Parch & Dry Fin. Groc. Sulphite 30 lb. | 4.75 – | |
| Steam Finish, 50 lb. | 4.00 – | |
| Water Finish, 40 lb. | 4.50 – | |
| **Manilas—** | | |
| Envp. Mla., Sub. 16-40 (No. 1) | 5.00 – | |
| Envp. Mla., Sub. 16-28 (No. 2) | 4.75 – | |
| Envp. Mla. (Prices based on large sheets untrim'd remarked, in bdls.) | | |
| **Wrapp. Mla. 35 lb. up—** | | |
| No. 1 | 5.25 – | |
| No. 2 | 5.00 – | |
| **M. G. Sulphite and Kraft (other than Waxing)** | | |
| Grade A-25 lb. | 5.75 – | |
| Grade B-25 lb. | 5.25 – | |